UNITED STATES DISTRICT COURT
DISTRICT OF MINNESOTA

MOLDEX-METRIC, INC., Plaintiff, vs. 3M COMPANY and 3M INNOVATIVE PROPERTIES COMPANY, Defendants.	Civil No. 14-1821 (JNE/FLN) **[PUBLIC VERSION]** **DECLARATION OF SIGFRID D. SOLI IN SUPPORT OF MOLDEX'S OPPOSITION TO 3M'S MOTION FOR PARTIAL SUMMARY JUDGMENT AND/OR FOR JUDGMENT ON THE PLEADINGS (ECF NO. 195 ET SEQ.)**

I, Sigfrid D. Soli, hereby declare and state as follows:

1. I have personal knowledge of the facts set forth in this declaration, and could testify competently as to the matters set forth herein. I make this declaration in support of Moldex's Opposition to 3M's Motion for Partial Summary Judgment and/or Judgment on the Pleadings. ECF No. 195 *et seq*.

2. I was retained by the law firm of Quinn Emanuel Urquhart & Sullivan LLP ("Quinn Emanuel" or "Counsel"), counsel to Moldex-Metric, Inc. ("Moldex"), as an expert in the United States District Court for the District of Minnesota Civil Action No. 14-cv-01821-JNE/FLN.

3. I understand that 3M is asking the Court to rule that 3M's assertion in the case *3M Co. v. Moldex-Metric, Inc.*, Case No. 12-cv-611-JNE-FLN (D. Minn) ("the Patent Litigation") of U.S. Patent No. 6,070,693 ("the '693 patent"), directed to certain double-

ended earplugs, against Moldex's single-ended BattlePlug earplug was not objectively baseless. I understand that the resolution of 3M's motion depends in whole or in part on the construction of the '693 patent claims, which must be decided as a matter of law.

4. In the event that the Court considers extrinsic evidence in connection with claim construction, I have been asked to provide this declaration with my expert opinion as to how a reasonable person of skill in the art would construe the claims of U.S. Patent No. 6,070,693 ("the '693 patent"). I also have been asked to provide my expert opinion, based on this claim construction of the '693 patent, whether Moldex's BattlePlug infringes the '693 patent. I also have been asked to provide my expert opinion, based on the constructions 3M would have had to advance during the Patent Litigation to establish infringement by the accused BattlePlugs, whether the '693 patent is invalid.

SUMMARY OF QUALIFICATIONS

5. I currently hold the position of Senior Clinical Research Scientist at the House Clinic in Los Angeles, California, an institution that specializes in treating hearing disorders. I am also a Professor of Audiology at the University of British Columbia in Vancouver, British Columbia (Adjunct); a Clinical Professor of Otolaryngology[1] at the University of Southern California, in Los Angeles, California (Adjunct); and a Guest Professor of Otolaryngology at West China Hospital of Sichuan University in Chengdu, China. I am also a Fellow at the Acoustical Society of America.

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[1] Otolaryngology is the study within the medical field of diseases and disorders of the ear, nose, throat (ENT), and related structures of the head and neck.

6. In addition to these positions, I am currently a Senior Scientific Advisor for Widex A/S, one of the world's largest hearing aid manufacturers. I am also an expert consultant on functional hearing requirements and assessment for the United States Federal Occupational Safety & Health Administration; a Senior Consultant for the China Rehabilitation Research Center for Deaf Children; and a Senior Academic Consultant for the Chinese Academy of Audiological Rehabilitation. In these various roles, I have collaborated with researchers in the United States, Canada, and China to develop objective methods for assessing patients' functional hearing abilities.

7. I received my Bachelor of Arts in Physics and Mathematics from St. Olaf College in 1968. I received my Bachelor of Arts from the University of Minnesota in Psychology in 1974. I received my Ph.D. in Experimental Psychology from the University of Minnesota's Center for Research in Human Learning in 1978.

8. From 1984 to 1989, I served as Senior Speech Scientist in the Communications Group of the Hearing Research Laboratory at 3M Company. In this capacity, I worked on developing and evaluating cochlear implant and hearing aid technologies.

9. Between 1989 and 2013, I held various positions at the House Ear Institute in Los Angeles, California, where I focused on the design and development of hearing diagnostics, auditory assessment procedures—such as the Hearing In Noise Test ("HINT" Test)—and hearing devices. My titles included Vice President for Technology Transfer (1995-2012), Head of the Department of Human Communication Sciences and Devices (1989-2013), and Acting Director of Research (1994-1995). I also served as a Distinguished Scientist Emeritus at the House Research Institute from 2011 to 2014.

10. I have previously held a variety of investigative, consulting, advisory, and academic positions in fields related to audiology and otolaryngology. I was an investigator for the University of Minnesota's Mechanisms of Auditory Processing Program Project (1988-1991). I consulted on speech processors for auditory prostheses at the Research Triangle Institute (1988-1993, 1997), on auditory prosthesis research and development at the Advanced Bionics Corporation (1993-1996), for the United States National Institute on Deafness and Other Communication Disorder (1993-1998), and for the National Research Council's Committee on Disability Determination for Individuals with Hearing Impairments (2003). I was also retained as a Hearing Specialist by the Corrections Standard Authority to develop hearing standards for California Correctional Officers (2008-2011); the DHA Group, Inc. to develop hearing standards for Federal Bureau of Investigation Agents (2010-2014); and the Ontario ministry of Community Safety and Correctional Services (2012-2014). In addition, I was a Member of the United States Food and Drug Administration ENT Device Panel (2001-2005). I was also a Visiting Professor of Otolaryngology at the Chinese University of Hong Kong (2008) and the Guest Editor of the International Journal of Audiology (2008).

11. I have also served as Chair of various conferences related to audiology and otolaryngology. These conferences include the Arrowhead Conference on Advanced Topics in Hearing Aid Research (1990, 1992, 1994, 1996, 2000, 2002, and 2004); the Management Committee for the House Ear Institute—Archer Communications HEAR Joint Venture (1991-1999); the Digital Signal Processing for Hearing Aids session between the Acoustical Society of the America and the Acoustical Society of Japan

(1996); and the International Hearing Aid Research Conference (IHCON) (2006, 2008, and 2010). I also served as the General Chair of the Newport Beach meeting of the Acoustical Society of America (2000), and am currently the Founding Chair of the Lake Arrowhead and Lake Tahoe Hearing Aid Research Conference.

12. I also have experience with the U.S. Patent system generally, and patented auditory technologies in particular. I am a named co-inventor on eight U.S. Patents and a total of 30 international patents. These patents include: "Pressure-regulating ear plug" (U.S. Patent No. 5,819,745); "Signal processor for and an auditory prosthesis utilizing channel dominance" (U.S. Patent No. 4,813,417); "Method of signal processing for maintaining directional hearing with hearing aids" (U.S. Patent No. 5,325,436); "Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering" (U.S. Patent No. 5,402,496); "Auditory prosthesis for adaptively filtering selected auditory component by user activation and method for doing same" (U.S. Patent No. 6,563,031 B1); and "Frequency shifter for use in adaptive feedback cancellers for hearing aids" (U.S. Patent No. 7,609,841).

13. My current curriculum vitae is attached to this declaration as Exhibit A, which includes the biographical information summarized above and a list of my patents, publications, and presentations.

APPLICABLE LEGAL STANDARDS

14. The section below sets forth certain legal standards that counsel for Moldex has provided to me, as I understand them.

Claim Construction

15. I understand that the language of the claims is construed as it would be understood by one of ordinary skill in the art at the time of the filing of the patent application in the context of the patent. I understand that the starting point for claim construction is the language of the claims, but that the claims must be read in view of the other intrinsic evidence of record. The intrinsic evidence of record includes the language of the claims, the patent specification, the prosecution history, and any related patents and their intrinsic evidence of record. I further understand that the specification is always highly relevant to claim construction and is the single best guide to the meaning of terms.

16. I understand that words in a claim may be given a meaning other than their ordinary and accustomed one if it appears that the inventor used them differently. I understand the use of the phrase "the present invention" to refer to a specific improvement of a known system or to distinguish over the prior art of record can define and limit the scope of the invention. In addition, I understand that the specification may reveal a special definition of a claim term, or it may contain a disavowal of claim scope by the inventor. For example, the specification may distinguish over the prior art in a way that implicitly surrenders claim scope, or the prosecution history of the patents may limit the interpretation of the claim especially to exclude any claim interpretation given up on or disavowed by the inventor in order to obtain allowance.

17. I understand courts construe claims as a matter of law based on a review of the intrinsic record. I further understand that courts may rely on extrinsic evidence, such as inventor and expert testimony, dictionaries, and learned treatises, to provide background

on the technology at issue, to explain how an invention works, or to explain the meaning of a term as it would be understood by one of skill in the art. I understand such evidence, however, cannot be used to contradict the intrinsic evidence of record.

18. I understand when reasonably possible, claims should be construed to preserve their validity. I understand this principle, however, does not allow courts to redraft the claims in a manner inconsistent with the intrinsic evidence to preserve their validity. I further understand that if the only claim construction that is consistent with the claim's language and the written description renders the claim invalid, then the claim is invalid.

Infringement Analysis Is A Two-Step Process

19. I understand that determination of whether an accused product infringes a patent claim is a two-step process. First, the language of the claim is construed as set forth above. After the claim has been properly construed, the claim is compared with the accused product to determine whether all of the features of the claim are present "literally" or by a substantial equivalent. The evaluation of literal infringement is a process of determining whether the accused product has each and every element specified in the properly construed claim. If even one element is not present, no literal infringement occurs. I also understand that the patent owner has the burden of proving literal infringement.

20. I understand that 3M asserted only claims of literal infringement with respect to the '693 patent in the underlying Patent Litigation.

Invalidity Analysis Is A Two-Step Process

21. I understand that determination of whether a patent claim is invalid is also a two-step process. First, the language of the claim is construed as set forth above. The second step compares the construed claims to the prior art to determine whether the limitations of the claims are met by the prior art. A patent is invalid for lack of novelty if a single prior art reference expressly or inherently discloses each and every limitation of the claimed invention. A patent is invalid as obvious to a person of ordinary skill in the art if its limitations are disclosed in a combination of prior art references and there is either a motivation to combine the references or it would be obvious for such a person of ordinary skill to try such a combination.

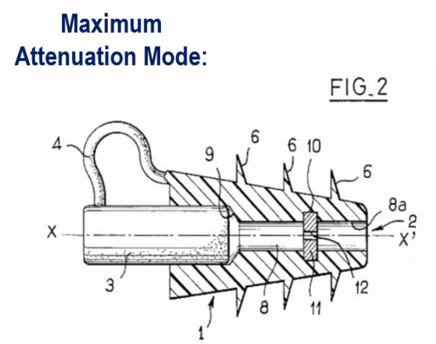
'693 PATENT OVERVIEW AND CLAIM CONSTRUCTION

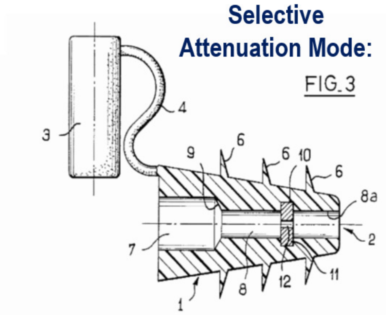
22. The '693 patent, entitled "Hearing Protector Against Loud Noise" and issued to Pascal Hamery on June 6, 2000, "relates to hearing protectors, and in particular…to a hearing protector to protect against high, continuous or impulse, noises." Like prior art hearing protectors, the hearing protector can function either in a selective attenuation mode or a maximum attenuation mode. Col. 1, Lin. 13-15, 30-36. There are 17 claims recited at the end of the '693 Patent. Independent claim 1 and dependent claims 3 and 17 were asserted by 3M against Moldex in the underlying Patent Litigation.

23. In describing the '693 patented invention, the '693 patent specification describes a problem with prior art earplugs that it solves and specifically distinguishes single-ended prior art earplugs that have this problem such as the one disclosed in French Patent Publication No. 2 676 642 ("FR'642"). Col. 1, Lin. 30-47.

24. As described in the '693 specification: "The [FR'642 single-ended] protector comprises an elongate flexible body containing selective attenuation means, maximum attenuation means, and a manually controlled plug that makes it possible to choose the attenuation functional mode to be either selective or maximum." Col. 1, Lin. 32-36.

25. The FR'642's "manually controlled plug" for changing attenuation levels is shown as item number 3 in annotated Figures 2 and 3 below from the French reference. The protector body (1) is pierced with a constricted channel that runs from an opening at the insertable end (2) of the earplug, designated x' in Figure 2, to an opening to the outside of the plug (7), designated x in Figure 2. Figures 2 and 3 disclose a first embodiment in two different attenuation modes:





26. In maximum attenuation mode (Figure 2), the plug 3 is inserted to block the channel opening at the non-inserted end of the earplug to stop all sound passage. In selective attenuation mode (Figure 3), the plug is removed so that sound can enter the channel. That channel, with its constrictions, is a "selective attenuation means" as described in the '693 patent specification.

27. FR'642 discloses an alternative embodiment in Figure 4, annotated and depicted below, where the plug element 35 has a different shape and connection to the rest of the

device. The user of this Figure 4 embodiment of the FR'642 hearing protector can increase attenuation by adjusting the plug element to block the constricted channel. It is accomplished by moving plug 35 over the rod 26 for greater or lesser attenuation of outside sounds. Col. 10, Lin. 22-27.

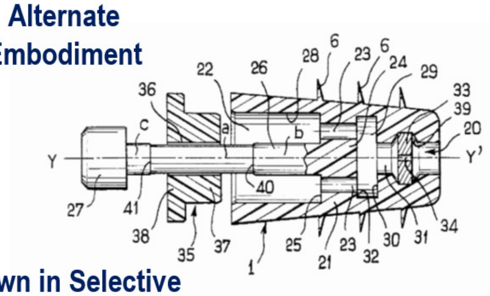


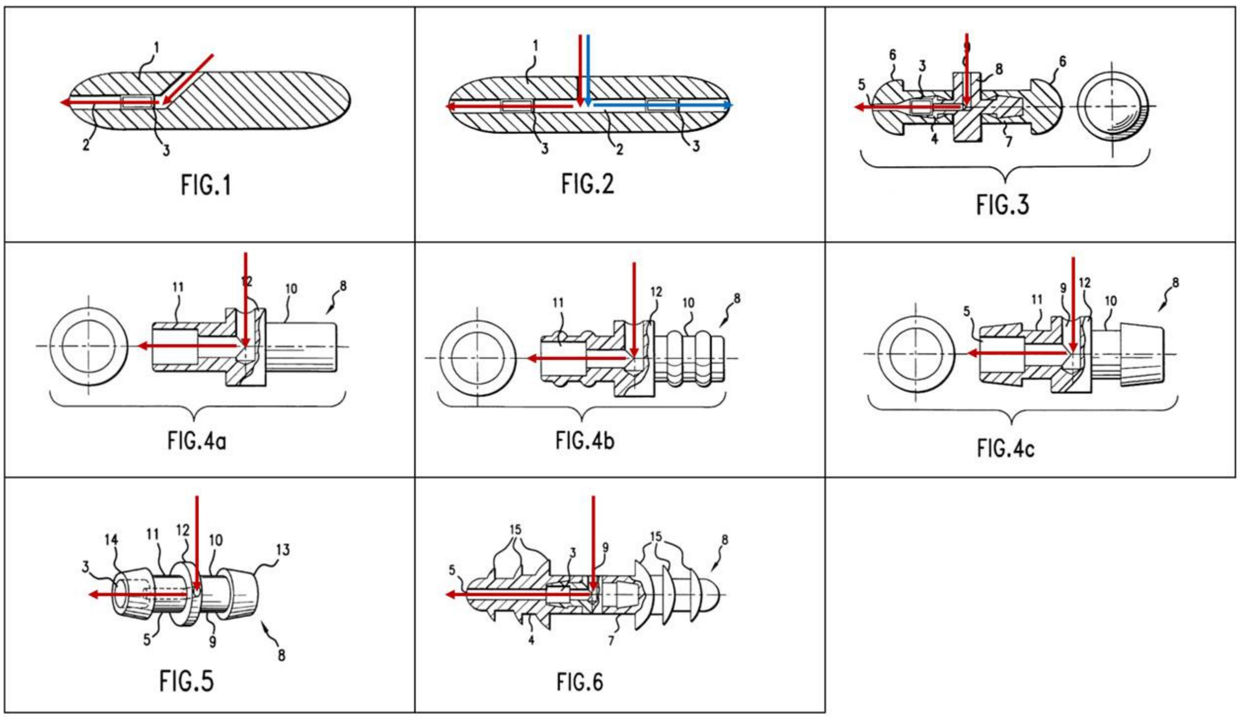
FIG.4

28. As described above, the '693 patent specification explicitly identifies a problem to be solved in single-ended earplug configurations like the FR'642 hearing protectors shown above: "[This FR'642 single-ended] device requires careful handling by the user who wants to block the auditory canal himself. This manipulation can be done incorrectly, resulting in inefficient blockage in the selective or maximum attenuation modes." Col. 1, Lin. 37-41.

29. The '693 patented invention solves this problem by "provid[ing] a reliable hearing protector that does not suffer from the disadvantage of user adjustment and permits two configurations for noise attenuation that have different characteristics." Col. 1, Lin. 44-47. The solution described in the '693 specification and claims is a dual-ended hearing protector. This dual-ended hearing protector invention avoids the problem with careful user adjustment by having "two ends, both of which can be inserted into the auditory canal and is referred to as a 'double-ended' device." Col. 1, Lin. 57-59. This

allows the user to change attenuation modes by "simply reversing the direction of the hearing protector, or ear plug that is inserted into the auditory canal." Col. 1, Lin. 57 - Col. 2, Lin. 5.

30. Each of the Figures 1, 2, 3, 4a, 4b, 4c, 5, and 6 in the '693 patent show a dual-ended hearing protector or components thereof (as illustrated in the annotated collage below) and all are described in the specification as part of a hearing protector with two insertable ends.



31. Figure 1 of the '693 patent specification (which is the same in terms of the relevant dual-ended feature as Figures 3, 4a, 4b, 4c, 5 and 6 for purposes of my analysis set forth below) shows one end that is completely solid and the other end that has a channel that allows some sound to pass into the ear through filter 3:

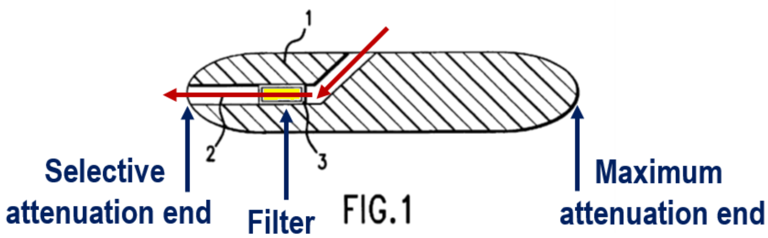
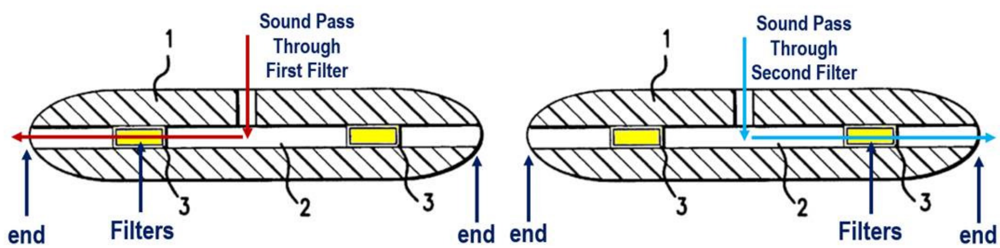


FIG.1

32. By inserting the end that is completely solid into the ear, the user can achieve maximum attenuation. The user can then change to selective attenuation mode by reversing the earplug and inserting the end with the channel to the outside of the earplug. There is no need for careful user adjustment; the user simply reverses the end of the hearing protector in the ear to achieve different sound attenuation levels.

33. Figure 2 sets forth a second dual-ended configuration. It is clear that the '693 patent claims cover this configuration because independent claim 1 of the '693 patent requires a first and second acoustic filter and that is the only species of the invention that the examiner identified during prosecution with two filters. Col. 4, Lin. 30-42. The specification also states "FIG. 2 is a longitudinal section view of the hearing protector according to a second embodiment of the present invention. The hearing protector includes a body 1 pierced by a channel 2 that terminates at each end of the body 1, as well as the center of body 1. The channel 2 also contains an acoustic filter 3 at each end." Col. 3, Lin. 17-23. The Figure 2 dual-ended configuration, annotated and depicted below, shows that the user can change attenuation modes by simply changing which end is inserted into the ear:



34. The '693 patent was filed January 20, 1999, as a divisional application of U.S. Pat. No. 5,936,208 patent ("the '208 patent"). The application that gave rise to the '208 patent was filed December 18, 1997. The '693 and the '208 patents share the same patent specification and both claim priority from French Pat. App. No. 97.11623, which was filed September 18, 1997. The '693 and '208 patents had the same examiner. There are no statements by the examiner or the patent applicant in the prosecution history of the '208 patent or the '693 patent that the claimed "invention" covers hearing protectors with only one insertable end. Nor are there any statements that the claimed "invention" covers hearing protectors without a hole in the center of the channel. Nor are there any statements describing multiple constrictions in a sound path as more than one filter.

Level of Ordinary Skill in the Art

35. In my opinion, a person of ordinary skill in the art in the field of the asserted '693 patent in the September 1997 timeframe would have had a bachelor's degree in acoustics, mechanical engineering, hearing and speech science, or their equivalent, and 2 or more years of relevant professional experience with acoustics and sound devices.

Construction of the '693 Patent Asserted Claims

36. 3M asserted claims 1, 3 and 17 of the '693 patent in the Patent Litigation, which are set forth in full below:

> 1. A hearing protector for selectively or automatically reducing noises having intensities up to 190 dB, the hearing protector being intended to be sealingly inserted into an auditory canal of a user, the hearing protector comprising:
>
> a cylindrical body having a center, a first end and a second end;
>
> a channel extending from said first and second ends to said center of said cylindrical body; and
>
> said channel containing a first acoustic filter and a second acoustic filter, each of said first and second filters being in communication with one of said first and second ends.
>
> 3. The hearing protector according to claim 1, wherein said first and second acoustic filters are not identical.
>
> 17. The hearing protector according to claim 1, wherein said acoustic filters permit non-linear filtration of sound

37. Claim 1 of the '693 patent (and its dependents) contains three elements, any one of which when properly construed, showing that no reasonable attorney or litigant could expect to succeed in accusing Moldex's BattlePlugs of infringing the '693 patent.

(1) "a cylindrical body having a center, **a first end and a second end**"

38. In order to succeed in the Patent Litigation, 3M would have had to construe the above element of the '693 patent to cover a hearing protector that has only one insertable end. In my opinion, it is not reasonable, reading the claims in the context of the intrinsic record, to construe the '693 patent claims to cover hearing protectors with only one insertable end.

39. The '693 patent claims, when read in the context of the intrinsic record, clearly demonstrate that the terms "first end" and "second end" require the claimed hearing protector to have two ends, each of which is insertable into the auditory canal.

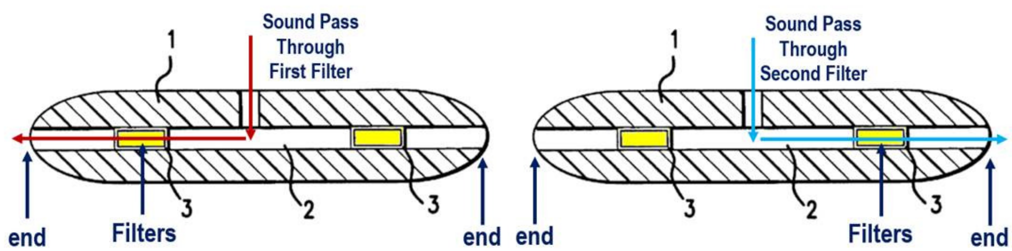
40. The '693 patent specification repeatedly states that the invention is a dual-ended hearing protector, with two ends that are insertable into the ear, and explicitly distinguishes over single-ended hearing protectors, i.e., with only one insertable end:

> **The hearing protector has two ends**, **both of which can be inserted into the auditory canal and is referred to as a "double-ended" device**. **This contrasts with the well-known hearing protector that typically has one end that can be inserted into the auditory canal**, while the other end allows the hearing protector to be gripped so the user can position it in the auditory canal. **The present invention has two ends**, that may or may not be identical, **either of which can be inserted into the auditory canal**, thus making it possible to choose between two operating modes of attenuation that may or may not be identical.
>
> **The device is useful in the fact that it possesses**, in the same hearing protector, **two configurations** that can have different attenuation characteristics, **both obtained by simply reversing the direction of the hearing protector, or ear plug, that is inserted into the auditory canal**.

Col. 1, Lin. 57 - Col. 2, Lin. 5. Emphasis added.

41. This language is not limited to particular embodiments. It is clear that it applies to the invention as a whole, including every possible embodiment. The specification is entirely consistent—each and every depiction and description of the invention shows a double-ended hearing protector—never a single-ended hearing protector. For example, all configurations of the invention (shown and discussed above), which were identified by the patent office during prosecution, shows the invention is directed to dual-ended hearing protectors, not single-ended.

42. The specification describes these configurations as dual-ended protectors. Col. 2, Lin. 48-67. For example, Figure 2 is described and depicted in the specification as a "double-ended" hearing protector:



43. As described and shown above, the user changes attenuation modes by changing which end is inserted. It is this double-ended construction and reversibility that does not require careful user manipulation of the plug to block sound which distinguishes the invention over the careful manipulation required to obtain levels of sound attenuation provided by the prior art FR'642 reference cited in the specification.

44. In fact, the claims, read in the context of the '693 patent specification, distinguish devices that require users to block the channel to increase sound attenuation:

> [This FR'642 single-ended] device requires careful handling by the user who wants to block the auditory canal himself. This manipulation can be done incorrectly, resulting in inefficient blockage in the selective or maximum attenuation modes ... . The goal of the present ['693 patent] invention is to provide a reliable hearing protector that does not suffer from the disadvantage of user adjustment and permits **two configurations** for noise attenuation that have different characteristics.

Col. 1, Lin. 37-47. Emphasis added. "The [patented] device is useful in the fact that it possesses, in the same hearing protector, two configurations that can have different attenuation characteristics, both obtained by simply reversing the direction of the hearing protector, or ear plug, that is inserted into the auditory canal." Col. 2, Lin. 1-5.

45. Claim 1, the only independent claim of the '693 patent, also requires that the channel extending from each end of the cylindrical body of the earplug to the center "contain[] a first acoustic filter and a second acoustic filter, ***each of which said first and***

second filters being in communication with one of said first and second ends." Col. 4, Lin. 30-42 (emphases added). This limitation would only make sense in a double-ended plug; a sound path has only one filtering effect, and thus a claim requiring a filter in communication with either end indicates to a person of ordinary skill in the art that the earplug is double-ended.

46. There are no statements by the examiner or the patent applicant in the prosecution history of the '208 patent or the '693 patent that the claimed "invention" covers hearing protectors with only one insertable end.

47. It is not reasonable to conclude that the "first end" and "second end" in the claims refers to a single-ended hearing protector with only one insertable end. Rather, it is my opinion that the claim, read in the context of the intrinsic record, must be construed to require a hearing protector with two insertable ends.

(2) "**a channel extending from said first and second ends to said center of said cylindrical body**"

48. In order to succeed in the Patent Litigation, 3M also would have had to construe the above element of the '693 patent to cover a hearing protector that does not have any hole in the center of the channel to allow sound to enter. In my opinion, it is not reasonable, reading the claims in the context of the intrinsic record, to construe the '693 patent claims to cover hearing protectors with no opening in the center of the channel.

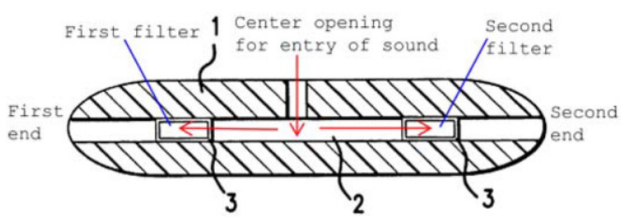
49. The '693 patent claims, when read in the context of the intrinsic record, clearly demonstrate that "a channel extending from said first and second ends to said center of said cylindrical body" requires the claimed hearing protector to have a hole in the center.

50. The specification's description of Figure 2—which is the only figure that corresponds with the claims of the '693 patent—explains that the claimed channel requires an opening to the outside of the earplug at the center, between the two filters of the earplug:

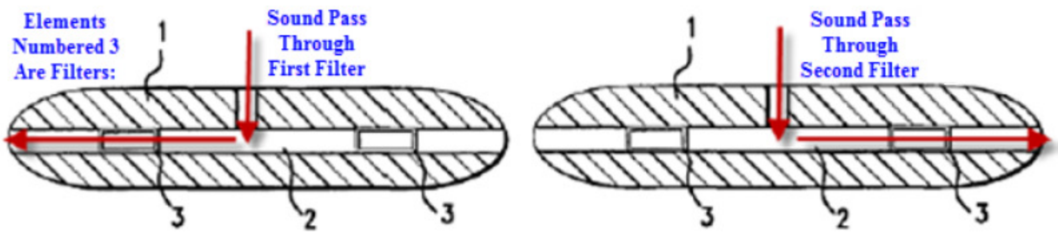
> Fig. 2 is a longitudinal section view of the hearing protector according to a second embodiment of the present invention. ***The hearing protector includes a body 1 pierced by a channel 2 that terminates at each end of the body 1, as well as the center of body 1.*** The channel 2 also contains an acoustic filter 3 at each end. The filters may or may not be identical."

Col. 3:17-23 (emphases added).

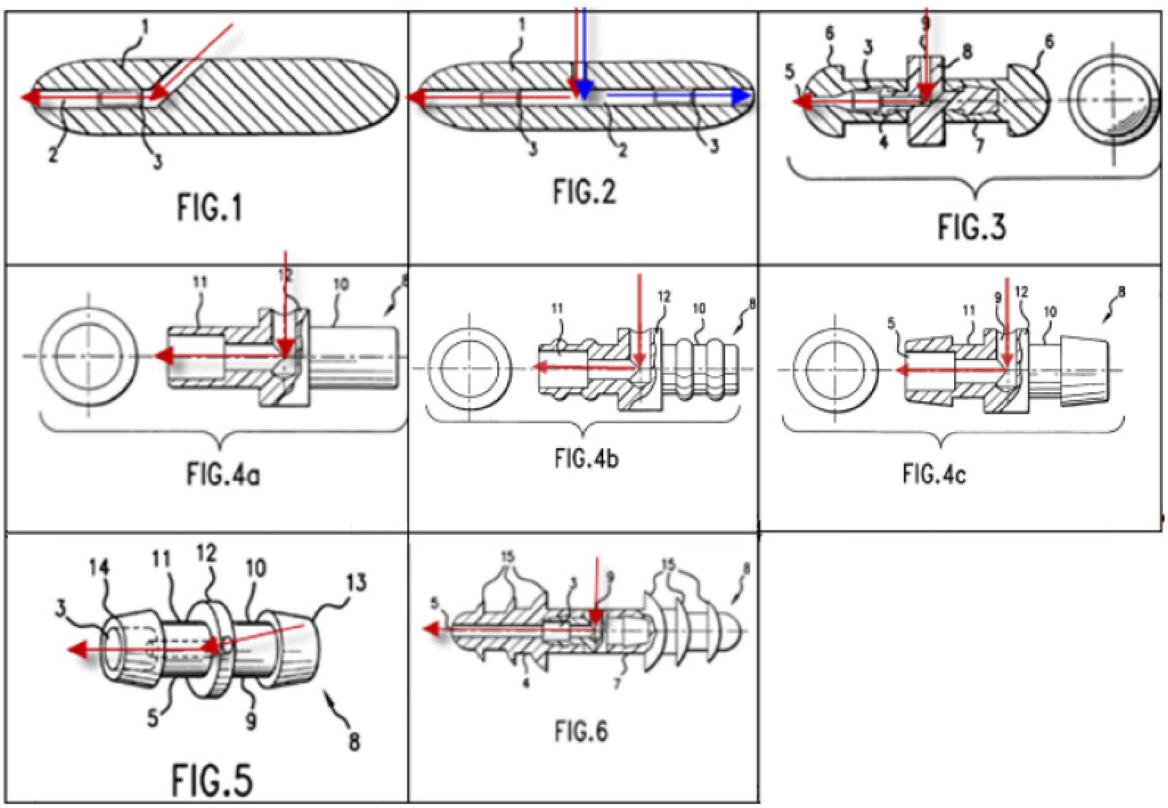
51. Because the channel "terminates at…the center of body 1," there must be an opening at the center to the outside—a channel with openings only at the ends does not "terminate" at the center. This opening at the center is clearly depicted in Figure 2, as annotated below:



52. The center opening plays a key role in allowing the '693 patent to achieve its usefulness: "The device is useful in the fact that it possesses, in the same hearing protector, two configurations that can have different attenuation characteristics, both obtained by simply reversing the direction of the hearing protector, or earplug, that is inserted into the auditory canal." Col. 2, Lin. 1-5.



53. Each of the specification's eight patentably distinct species of the claimed invention identified by the examiner also shows a channel opening at the center to allow sound to enter:



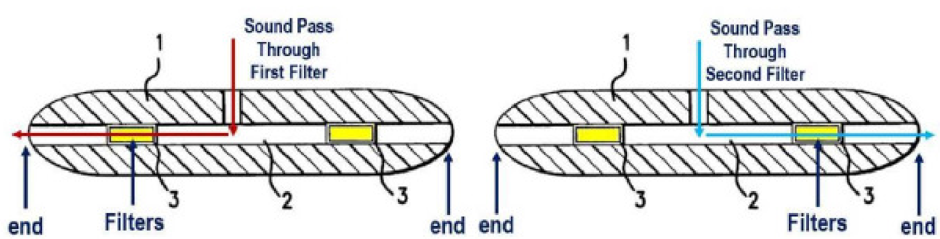
54. There are no statements by the examiner or the patent applicant in the prosecution history of the '208 patent or the '693 patent that the claimed "invention" covers hearing protectors without a hole in the center of the channel.

55. For the above reasons, the '693 patent's claimed "channel" must include an opening to the outside at the center of the earplug.

(3) "said channel containing **a first acoustic filter and a second acoustic filter, each of said first and second filters being in communication with one of said first and second ends**"

56. In order to succeed in the Patent Litigation, 3M also would have had to construe the above element of the '693 patent to cover a hearing protector that has two acoustic filters, one for each sound path of the dual-ended hearing protector. It is not reasonable, reading the explicit language of the claims and the specification, to construe the '693 patent claims to cover hearing protectors with one sound path and multiple constrictions.

57. Figure 2 of the '693 patent (annotated below)—the only species identified by the examiner that illustrates two filters—shows an input opening in the hearing protector center, output openings at both ends of the hearing protector, two sound paths from the input opening to the output openings at either end of the hearing protector, and the acoustic filters are in each sound path:



58. As shown above, only one filter is operative at a time because it lies between the central hole that directly connects the earplug to outside sounds and the end hole that

allows sound to pass through the earplug to the interior of the ear. The '693 patent further discloses that these two filters may or may not be identical. Col. 3, Lin. 22-23. Therefore, the existence of different possible sound paths through the different filters—which depend on the orientation of the earplug—is how the '693 patent's invention achieves different modes of attenuation depending on which end is inserted into the ear.

59. The sound path through an object such as a hearing protector may contain a series of constrictions of different diameters and different symmetric or asymmetric geometries designed to function as an acoustic valve or filter. For any given sound path, an acoustic valve or filter refers to the combination of constrictions or other means through which the sound travels.

60. There are no statements by the examiner or the patent applicant in the prosecution history of the '208 patent or the '693 patent describing multiple constrictions in a sound path as more than one filter.

61. Thus, properly construed, an acoustic valve or filter refers to the combination of constrictions or other means in a sound path through which the sound travels.

<u>INFRINGEMENT ANALYSIS OF MOLDEX'S ACCUSED PRODUCTS</u>

62. 3M accused Moldex's BattlePlug hearing protector products ("Accused Products") of infringing the asserted claims of the '693 patent.

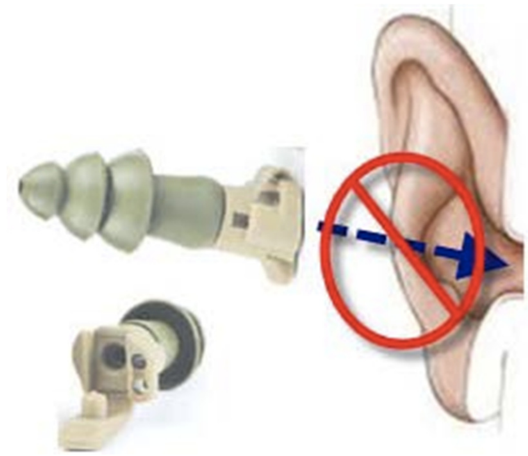
63. Although Moldex's Accused Products come in different sizes, colors and packaging, they are all identical with respect to the structural features relevant to my analysis of whether any reasonable attorney or litigant would succeed in accusing them of

infringement when the '693 patent claims are properly construed. Representative images of a set of the Accused Products are depicted below:

64. Asserted claim 1 (and dependent claims 3 and 17) of the '693 patent requires "a cylindrical body having a center, a first end and a second end"; "a channel extending from said first and second ends to said center of said cylindrical body"; and "said channel containing a first acoustic filter and a second acoustic filter, each of said first and second filters being in communication with one of said first and second ends." Moldex's Accused Products do not infringe if they lack any one of these limitations.

65. As explained above, the '693 patent claims, properly construed, are directed to a dual-ended hearing protector with each end insertable into the auditory canal, a hole in the center of the channel for sound to enter, and two filters. Moldex's Accused Products do not meet any of these requirements—the hearing protectors are single-ended earplugs (i.e., only one of the ends can be inserted into the ear) with a single channel that has multiple constrictions (i.e., one filter) and no hole in the center of the channel. As such, the Accused Products cannot and do not infringe any claim of the '693 patent.

66. Images and schematics of the Accused Products (and the physical exemplars I have examined) clearly demonstrate that each of these features is lacking:



[REDACTED IMAGE]

67. In contrast to the claimed invention of the '693 patent, one end of the Accused Products is a “plug handle” that is non-insertable. This is similar to the “well known” prior art single-ended earplugs that the '693 patent distinguishes over in the specification. The Accused Products also change attenuation mode through user adjustment of the cap at the non-insertable end—as in prior art such as the FR’642 reference—not by changing which end is inserted into the ear canal. The Accused Products also clearly do not have an opening for sound to enter in the center of the channel.

68. The only way that the Accused Products could have “a second acoustic filter” is if “acoustic filter” is construed to mean *any* constriction in a sound path. Not only is this construction inconsistent with the clear import of the ‘693 patent specification, it is also inconsistent with the inventor’s own writings. Pascal Hamery, the inventor of the '693 patent, is also a named inventor on U.S. Patent No. 6,068,079 (the “'079 patent”), which describes its invention as an “[a]coustic valve capable of selective and non-linear filtering

of sound and placeable in a perforated ear plug. The acoustic valve consists of a tube enclosing two rigid disks axially spaced opposite each other, each of the disks containing at least one perforation." Abstract. The perforated disks (items 21 and 21' in Figure 3a and items 30 and 30' in Figure 3b, both annotated below) are a series of constrictions within a sound channel, which are described as a single acoustic valve or filter:

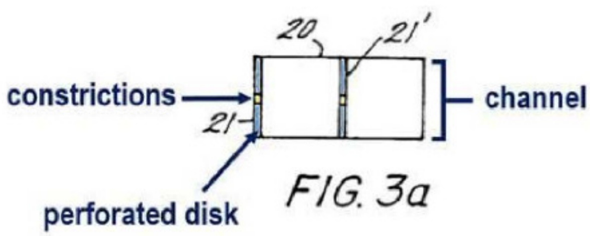


FIG. 3a

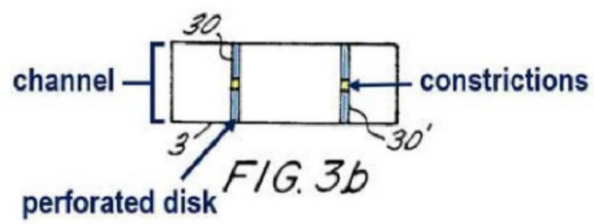


FIG. 3b

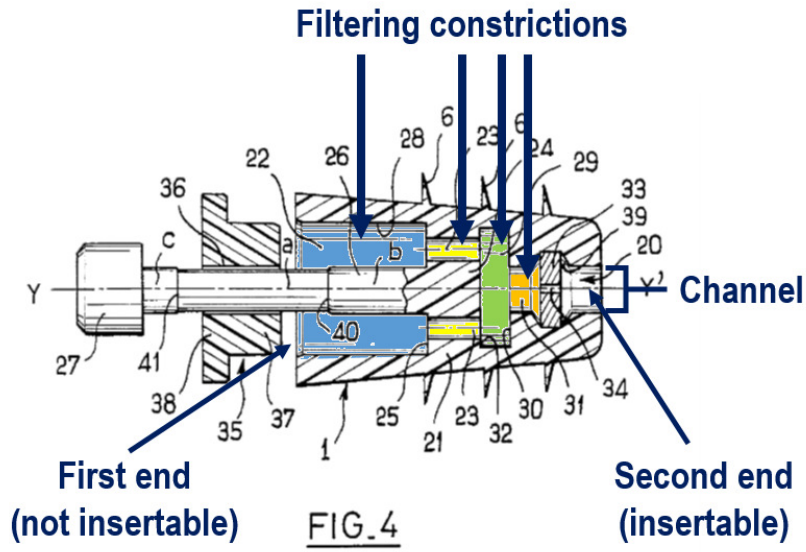
69. For all of these reasons, there is no infringement and no reasonable person in 3M's position could have expected to prevail on the merits in asserting a claim of infringement of the '693 patent against Moldex's Accused Products.

INVALIDITY ANALYSIS

70. The complete set of claim constructions 3M would have had to advance in the Patent Litigation for the '693 patent to cover Moldex's Accused Products would clearly render the patent invalid in view of the prior art.

71. For example, if 3M's improper constructions were adopted in an attempt to cover Moldex's Accused Products, i.e., a single-ended hearing protector with a single channel running end to end and multiple constrictions, then the '693 patent would also read directly on the FR'642 patent, which the '693 patent distinguished over in the specification. As shown below, the FR'642 patent discloses a hearing protector with one

insertable end (and a non-insertable second end) and a single channel running end to end and multiple constrictions for filtering sound:



72. As shown in FR'642, Figure 4 represents a "flexible body 1" that "is axially transversed by a channel 20 composed of a succession of cylindrical sections of different cross section which ensures a non-linear acoustic transmission." Col. 8, Lin. 14-16. "The succession of channel sections 22, 23, 29, and 31…ensures…a non-linear acoustic transmission that results in a selective attenuation of sounds based on the range of frequencies chosen to pass through the calibrated orifice 34 in laminar form." Col. 9, Lin. 11-18; Col. 12, Lin. 21-24 (claiming earplug with channel "composed of a plurality of channel sections (7, 8; 22, 23, 29, 31) ensuring a non-linear acoustic transmission"). Applying 3M's constructions, Figure 4 discloses a single-ended earplug, with a single channel, and multiple filters—*i.e.*, constrictions—within that single channel.

73. Thus, if the BattlePlug meets the limitations of the '693 patent, the FR '642 reference necessarily invalidates asserted claim 1. Asserted claim 3 requires that the first

and second acoustic filters are not identical, and asserted claim 17 requires that the acoustic filters permit non-linear filtration of sound. These features were also well-known in the FR '642 prior art and would invalidate the dependent claims. Figure 4 in FR '642 has a "succession of cylindrical sections *of different cross section* which *ensures a non-linear acoustic transmission*." Col. 8, Lin. 14-16 (emphasis added).

74. The key similarities between the prior art FR'642 reference and the Accused Products are unmistakable. If the '693 patent claims were construed as 3M would have to do to cover Moldex's Accused Products, *i.e.*, a single-ended hearing protector with a single channel, multiple constrictions and openings at both ends, then the Accused Products merely practice the FR'642 prior art and the '693 patent is necessarily invalid over the FR'642 prior art.

CONCLUSION

75. Based on the foregoing, in my opinion, no reasonable person in 3M's position could have had any reasonable expectation that it would succeed in establishing that Moldex's Accused Products infringe the '693 patent. The Accused Products do not have two insertable ends as required by each of the asserted claims, among other things, and the only way to read the claims on Moldex's Accused Products would render the '693 patent invalid. The need for 3M to rely on this improper claim interpretation demonstrates that 3M's claims were objectively unreasonable and baseless.

I declare, under penalty of perjury under the laws of the United States of America, that the foregoing is true and correct.

Executed this 22nd day of April 2016 in Halfmoon Bay, BC Canada.

Sigfrid D. Soli, Ph.D.

EXHIBIT A

Curriculum Vitae

Sigfrid D. Soli
December, 2015

Personal

Birth date: 15 May 1946

Nationality: American

Permanent Resident: Canada

Office Address

House Clinic

2100 West 3rd Street

Los Angeles, California 90057

Education

Ph.D., Experimental Psychology, Center for Research in Human Learning, University of Minnesota, Minneapolis, Minnesota, 1978

B.A., summa cum laude, Psychology, University of Minnesota, Minneapolis, Minnesota, 1974

B.A., cum laude, Physics and Mathematics, St. Olaf College, Northfield, Minnesota, 1968

Professional Experience

2014-present: Professor of Audiology, School of Audiology and Speech Sciences (Adjunct), University of British Columbia, Vancouver, British Columbia, Canada

2014-present: Clinical Professor of Otolaryngology (Adjunct), Keck School of Medicine at the University of Southern California, Los Angeles, California

2013-present: Senior Clinical Research Scientist, House Clinic, Los Angeles, California

2011-2014: Distinguished Scientist Emeritus, House Research Institute, Los Angeles, California

2008-present: Guest Professor, Department of Otolaryngology, West China Hospital of Sichuan University, Chengdu, China

1995-2012: Vice President, Technology Transfer, House Ear Institute, Los Angeles, California

1994-1995: Acting Director of Research, House Ear Institute, Los Angeles, California

1989-2013: Head, Human Communication Sciences and Devices Department, House Ear Institute, Los Angeles, California

1984-1989: Senior Speech Scientist, Communications Group, Hearing Research Laboratory, 3M Center, St. Paul, Minnesota

1984-1985: Associate Professor of Psychology, University of Maryland, College Park, Maryland

1983-1985: Research Associate, Haskins Laboratories, New Haven, Connecticut

1978-1984: Assistant Professor of Psychology, University of Maryland, College Park, Maryland

1977-1978: Research assistant in speech perception, Center for Research in Human Learning, University of Minnesota, Minneapolis, Minnesota

1974-1978: National Institutes of Health Graduate Trainee, Center for Research in Human Learning, University of Minnesota, Minneapolis, Minnesota

Other Experience

1968-1972: US Air Force Officer, promoted to Captain in 1971

Honors and Awards

- Fellow, Acoustical Society of America
- Circle of Technical Excellence, Biosciences Laboratory, 3M Company
- National Institutes of Health Traineeship, Center for Research in Human Learning, University of Minnesota, 1974-1978
- Sigma Pi Sigma, National Physics Honor Society
- Dean's Scholarship, St. Olaf College, 1965-1968

Professional Activities

Senior Scientific Advisor for Widex A/S, Copenhagen, Denmark, 2012-present.

Hearing Specialist to develop hearing standards for the Ontario Ministry of Community Safety and Correctional Services, 2012-2014

Hearing Specialist to develop hearing standards for Federal Bureau of Investigation Agents, subcontractor for DHA Group, Inc., 2010-2014

Hearing Specialist to develop hearing standards for California Correctional Officers, contractor for Corrections Standards Authority, 2008-2011

Senior Academic Consultant, Chinese Academy of Audiological Rehabilitation, Chengdu, PRC, 2010-present

Senior Consultant, China Rehabilitation Research Center for Deaf Children, Beijing, PRC, 2009-present

Guest Editor, **International Journal of Audiology**, for the special issue entitled "Assessment of Speech Communication Handicap," 2008

Guest Professor, Department of Otolaryngology/Head and Neck Surgery, West China Hospital of Sichuan University, Chengdu, China, 2006-present

Visiting Professor, Department of Otolaryngology/Head and Neck Surgery, Chinese University of Hong Kong, Hong Kong, China, 2008

Member, National Institutes of Health SBIR Review Panel, 2003-2011.

Consultant, Committee on Disability Determination for Individuals with Hearing Impairments, National Research Council, 2003

Chair, National Institutes of Health Special Emphasis Review Panel, April 2002

Member, ENT Device Panel, US Food and Drug Administration, 2001-2005

Member, Steering Committee, University of California Los Angeles Biomedical Engineering Program, 2000-2003

Member, Steering Committee, University of California Los Angeles Neuroengineering Program, 2000-2004

General Chair, Newport Beach meeting of the Acoustical Society of America, 2000

Founding Chair, Lake Arrowhead and Lake Tahoe Hearing Aid Research Conferences, 1990-present

Member, Southern California Biomedical Council Board of Directors, 1999-2003

Expert consultant on functional hearing requirements and assessment, US Federal Occupational Health, 1999-present

Chair, Special session entitled "Digital Signal Processing for Hearing Aids," Joint meeting of the Acoustical Society of America and the Acoustical Society of Japan, Honolulu, Hawaii, 1996

National Institute on Deafness and Other Communication Disorders Advisory Committee on Hearing Aid Research and Development, 1993 - 1998

Chair, Management Committee for House Ear Institute–Archer Communications HEAR Joint Venture, 1991 - 1999

Chair, Project Management Committee, Starkey Laboratories and HEAR Joint Venture, 1993 - 1999

Chair, Special session entitled "Education in Speech Communication," Salt Lake City meeting of the Acoustical Society of America, 1992

Chair, Special session entitled "Speech Perception and Hearing Handicap," Baltimore meeting of the Acoustical Society of America, 1991Advisory Consultant in speech perception and speech processing for cochlear implants, National Institutes of Health, 1991, 1993

Co-Chair, Special session entitled "Prediction and Physical Measurement of Speech Intelligibility," San Diego meeting of the Acoustical Society of America, 1990

Chair, Arrowhead Conference on Advanced Topics in Hearing Aid Research, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004

Chair, International Hearing Aid Research Conference (IHCON), 2006, 2008, 2010

Consultant, Speech Processors for Auditory Prostheses Contract to Research Triangle Institute, North Carolina, 1988-1993, 1997

Consultant, Auditory Prosthesis Research and Development, to Advanced Bionics Corporation, 1993-1996

Unpaid Coinvestigator, Mechanisms of Auditory Processing Program Project, University of Minnesota, 1988-1991.

Chair, Technical Committee on Speech Communication, Acoustical Society of America, 1989-1995

Member, Technical Committee on Speech Communication, Acoustical Society of America, 1985-present

Member, Nominating Committee, Acoustical Society of America, 1991, 1993

Member, Publications Committee, Acoustical Society of America

Co-chair, Engineering Research Foundation Conference on Implantable Auditory Prostheses, 1989

Reviewer for prosthesis research and speech perception, occasional reviewer for speech processing and for psychological acoustics, **Journal of the Acoustical Society of America, Journal of Speech and Hearing Research, Ear and Hearing, International Journal of Audiology, International Journal of Pediatric Otorhinolaryngology**

Membership in Professional Organizations

Sigma Pi Sigma, National Physics Honor Society

Publications

1. Xu, K, Soli, SD, Zheng, Y, Liu, S, Li, G, Tao, Y, Meng, Z (2015). Quantification of the effects of Mandarin dialect differences on the use of norm-referenced speech perception tests. **International Journal of Audiology**, in press.
2. Liang, S, Soli, SD, Zheng, Y, Li, G, Meng, Z (2015). Initial classification of pediatric hearing impairment using behavioral measures of early prelingual auditory development. **International Journal of Audiology**, in press.

3. Bei, L, Soli, SD, Zheng, Y, Li, G (2014). Development of Mandarin spoken language after pediatric cochlear implantation. **International Journal of Pediatric Otorhinolaryngology**, 78(7), 1000-1009.
4. Soli, SD, Zheng, Y, Meng, Z, Li, G (2012). Clinical assessment of early language development: A simplified short form of the Mandarin Communicative Development Inventory. **International Journal of Pediatric Otorhinolaryngology**, 76(9), 1255-1264.
5. Zheng, Y, Xu, K, Li, G, Meng, Z, Wang, K, Tao, Y, Soli, SD (2012). Outcome assessment alternatives for young children during the first 12 months after pediatric hearing aid fittings. **International Journal of Audiology**, 51(11), 846–855.
6. Amano-Kusumoto, A, Aronoff, JM, Itoh, M, Soli, SD (2012). The effect of dichotic processing on the perception of binaural cues. **Interspeech,** ISCA 2012.
7. Aronoff, JM, Freed, DJ, Fisher, LM, Pal, I, Soli, SD (2012). Cochlear implant patients' localization using interaural level differences exceeds that of untrained normal hearing listeners. **Journal of the Acoustical Society of America**, 131(5), EL382-387.
8. Zheng, Y, Soli, SD, Tao, Y, Xu, K, Meng, Z, Li, G, Wang, K, Zheng, H (2011). Early prelingual auditory development and speech perception at 1-year follow-up in Mandarin-speaking children after cochlear implantation. **International Journal of Pediatric Otorhinolaryngology**, 75, 1418-1426.
9. Aronoff, JM, Freed, DJ, Fisher, L, Pal, I, Soli, SD (2011). The effect of different cochlear implant microphones on acoustic hearing individuals' binaural benefits for speech perception in noise. **Ear & Hearing**, 32, 486-484.
10. Bunnell, H., Lilley, J. Soli, SD, Pal, I (2011). Utterance Verification for automating the Hearing In Noise Test (HINT), **Proceedings Interspeech 2011**, 2985-2988.
11. Aronoff, JM, Yoon, Y-S, Vermiglio, AJ, Pal, I, Soli, SD (2010). The use of interaural time and level difference cues by bilateral cochlear implant users. **Journal of the Acoustical Society of America**, 127(3), EL87-92.
12. Aronoff, JM, Yoon, Y-S, Soli, SD (2010). Stratification of American hearing aid users by age and audiometric characteristics: A method for representative sampling. **Ear & Hearing**, 31, 401-406.
13. Soli, SD, Zheng, Y (2009). Long-term reliability of pediatric cochlear implants. **Otology & Neurotology**, 31, 899-901.
14. Hodgetts, W.E., Hagler, P., Hakansson, B.E.V., & Soli, S. (2011). Technology-Limited and Patient-Derived Versus Audibility-Derived Fittings in BAHA Users: An Efficacy Study. **Ear & Hearing,** 32, 1, 31-39.
15. Hodgetts, W.E., Hakansson, B.E.V., Hagler, P., & Soli, S. (2010). A Comparison of Three Approaches to Verifying Aided Baha Output. **International Journal of Audiology**, 49, 4, 286-295.
16. Zheng, Y, Soli, SD, Meng, Z, Tao, Y, Wang, K, Xu, K, & Zheng, H. (2010). Assessment of Mandarin-speaking pediatric cochlear implant recipients with the Mandarin Early Speech Perception (MESP) test. **International Journal of Pediatric Otorhinolaryngology**, 74(8), 920-925.
17. Zheng, Y, Soli, SD, Meng, Z-L, Tao, Y, Meng, J, Zu, K, and Wang, K (2009). Development and of the Mandarin Early Speech Perception test: Children with normal hearing and the effects of dialect exposure. **Ear & Hearing,** 30(5): 600-612.
18. Zheng, Y, Soli, SD, Wang, K, Meng, J, Meng, Z, Zu, K, Tao, Y (2009). A normative study of early prelingual auditory development. **Audiology and Neurotology**, 14: 214-222.

19. Zheng, Y, Soli, SD, Wang, K, Meng, J, Meng, Z, Xu, K, Tao, Y (2009). Development of the Mandarin pediatric speech intelligibility (MPSI) test. **International Journal of Audiology**, 48: 718-728.

20. Koch, DB, Soli, SD, Downing, M, & Osberger, MJ. (2009). Simultaneous bilateral cochlear implantation: Prospective study in adults. **Cochlear Implants International**. doi: 10.1002/cii.413.

21. Soli, SD (2008). Some thoughts on communication handicap and hearing impairment. **International Journal of Audiology**, 47, 285-286.

22. Chan, JCY, Freed, DJ, Vermiglio, AJ, and Soli, SD (2008). Evaluation of binaural functions in bilateral cochlear implant users. **International Journal of Audiology**, 47, 296-310.

23. Giguere, C, Laroche, C, Soli, SD, and Vaillancourt, V (2008). Functionally-based screening criteria for hearing-critical jobs based on the Hearing In Noise Test. **International Journal of Audiology**, 47, 319-328.

24. Soli, SD, and Wong, L (2008). Assessment of speech intelligibility in noise with the Hearing In Noise Test. **International Journal of Audiology**, 47, 356-361.

25. Yuan, M, Lee, T, Soli, SD (2008). Mandarin tone perception with temporal envelope and periodicity cues from different frequency regions. **Chinese Spoken Language Processing, 2008**. ISCSLP 2008.

26. Wong, LL, Chu, EWW, and Soli, SD (2007). Development of the Cantonese Speech Intelligibility Index. **Journal of the Acoustical Society, 121(4)**, 2350-2361.

27. Wong, LL, Soli, SD, Liu, S, Han, N, and Huang, M-W (2007). Development of the Mandarin Hearing In Noise Test (MHINT). **Ear & Hearing**, 28, 70-74S.

28. Yuen, KCP, Yuan, M, Lee, T, Soli, SD, Tong, MCF, and van Hasselt, CA (2007). Frequency-specific temporal envelope and periodicity components for lexical tone identification in Cantonese. **Ear & Hearing**, 28, 107-113S.

29. Colletti, V, Soli, SD, Carner, M, and Colletti L (**2006**). Treatment of mixed hearing losses via implantation of a vibratory transducer on the round window. **International Journal of Audiology**, 45, 600-608.

30. Freed, D, and Soli, S (**2006**). An objective procedure for evaluation of adaptive antifeedback algorithms in hearing aids, **Ear & Hearing** 27(4), 382-398.

31. Wong, LN and Soli, SD (**2005**). Development of the Cantonese Hearing In Noise Test (CHINT). **Ear & Hearing**, 26, 1-14.

32. Laroche, C, Giguere, C, Vaillancourt, V, and Soli, SD (**2005**).Development and validation of hearing standards for Canadian Coast Guard seagoing personnel and Conservation & Protection seagoing and land-based personnel: Phase II. Final report prepared for Fisheries and Oceans Canada, Ottawa, Ontario.

33. Vaillancourt, V, Laroche, C, Mayer, C, Basque, C, Nali, M, Eriks-Brophy, A, Soli, SD, Giguere, C. (2005). Adaptation of the HINT (Hearing In Noise Test) for adult Canadian Francophone populations. **International Journal of Audiology**, 44, 358-369.

34. Laroche, C, Soli, SD, Giguère, C, Lagacé, J, Vaillancourt, V, and Fortin, M (**2003**). "An approach to the development of hearing standards for hearing-critical jobs," **Noise & Health**, 6:21, 17-37.

35. Soli, SD (**2003**). Hearing and job performance. Commissioned report for the Division of Behavioral and Sciences and Education, National Research Council, National Science Foundation, Washington, DC.

36. Moon, J-S, Athas, WC, Soli, SD, Draper, JT, & Beerel, PA. (2003). Voltage-pulse driven harmonic resonant rail drivers for low-power applications. **IEEE Transactions on Very Large Scale Integration (VLSI) Systems**, 11(5), 762-777.
37. Zeng, FG, Martino, KM, Linthicum, FH, and Soli, SD (**2000**). "Auditory perception in vestibular neurectomy subjects," **Hearing Research** 142, 102-112.
38. Fu, Q. J., Zeng, F. G., Shannon, R. V., & Soli, S. D. (1998). Importance of tonal envelope cues in Chinese speech recognition. **Journal of the Acoustical Society of America, 104(1)**, 505-510.
39. Nelson, D.A., Van Tasell, D.J., Schroder, A.C., and Soli, S.D. (**1995**). "Electrode ranking of 'place pitch' and speech recognition in electrical hearing," **Journal of the Acoustical Society of America 98**, 1987-1999.
40. Koch, D., Nilsson, M.J., and Soli, S.D. (**1995**). *A Primer on Binaural Hearing*, Starkey Laboratories: Minneapolis.
41. Koch, D., Nilsson, M.J., and Soli, S.D. (**1995**). *Users' Guide for the Hearing In Noise Test*, Starkey Laboratories: Minneapolis.
42. Nilsson, M., Soli, S.D., and Sullivan, J. (**1994**). "Development of the Hearing In Noise Test for the measurement of speech reception thresholds in quiet and in noise," **Journal of the Acoustical Society of America 95**, 1085-1099.
43. Nilsson, M, Gelnett, D, Sullivan, J, Soli, SD, & Goldberg, RL. (1992). Norms for the Hearing In Noise Test (HINT): The influence of spatial separation, hearing loss, and English language experience on speech reception thresholds. **Journal of the Acoustical Society of America**, 92(4), 2385.
44. Soli, S.D., and Nilsson, M. (**1994**). "Assessment of communication handicap with the HINT," **Hearing Instruments 45**, 12-16.
45. Mann, V., and Soli, S.D. (**1991**). "Perceptual order and the effect of vocalic context on fricative perception," **Perception & Psychophysics**.
46. Hoffman, M.W., Buckley, K.M., Link, M.J., and Soli, S.D. (**1991**). "Robust microphone array processor incorporating head shadow effects," **ICASSP 91**.
47. Dorman, M.F., Soli, S.D., Dankowski, K., Smith, L.M., McCandless, G., and Parkin, J. (**1990**). "Acoustic cues for consonant identification by patients who use the Ineraid cochlear implant," **Journal of the Acoustical Society of America 88,** 2074-2079.
48. Soli, S.D. (1990). "Perceptual evaluation of a neurally-based encoding strategy for cochlear implants," in J.M. Miller and F.A. Spelman (Eds.), ***Models of the Electrically Stimulated Cochlea***, Springer-Verlag, New York.
49. Van Tasell, D.J., Soli, S.D., Kirby, V.M., and Widin, G.P. (**1987**). "Speech waveform envelope cues for consonant recognition," **Journal of the Acoustical Society of America 82,** 1152-1161.
50. Dooling, R.J., Soli, S.D., Kline, R.M., Park, T.J., Hue, C., and Bunnell, T. (**1987**). "Perception of synthetic speech sounds by the budgerigar (Melopsittacus undulatus)," **Bulletin of the Psychonomic Society 25,** 139-142.
51. Dooling, R.J., Brown, S.D., Park, T.J., Okanoya, K., and Soli, S.D. (**1987**). "Perceptual organization of acoustic stimuli by the budgerigar (Melopsittacus undulatus): I. Pure tones," **Journal of Comparative Psychology 101,** 139-149.
52. Dooling, R.J., Brown, S.D., Park, T.J., Okanoya, K., and Soli, S.D. (**1987**). "Perceptual organization of acoustic stimuli by the budgerigar (Melopsittacus undulatus): II. Vocal Signals," **Journal of Comparative Psychology 101,** 367-381.

53. Soli, S.D., Arabie, P., and Carroll, J.D. (**1986**). "Discrete representation of perceptual structure underlying consonant confusions," **Journal of the Acoustical Society of America 79,** 826-837.
54. Gingrich, G., and Soli, S.D. (**1984**). "Subjective evaluation and allocation of resources in routine decision making," **Organizational Behavior and Human Performance 33,** 188-203.
55. Soli, S.D. (**1983**). "The role of spectral cues in the discrimination of voice onset time differences," **Journal of the Acoustical Society of America 73,** 2150-2165.
56. Soli, S.D. (**1982**). "Structure and duration of vowels together specify final fricative voicing," **Journal of the Acoustical Society of America 72,** 366-378.
57. Chew, S.L., Larkey, L.S., Soli, S.D., Blount, J., and Jenkins, J.J., (**1982**). The abstraction of musical ideas," **Memory and Cognition 10,** 413-423.
58. Arabie, P., and Soli, S.D., (**1982**). "The interface between type of regression and method of collecting proximities data," in R. Gollege and J.N. Raynor (Eds.), ***Proximity and Preference: Multidimensional Analysis of Large Data Sets***, 90-115. University of Minnesota Press, Minneapolis, Minnesota.
59. Yeni-Komshian, G.H., and Soli, S.D., (**1981**). "Recognition of vowels from information in fricatives: Perceptual evidence of fricative-vowel coarticulation," **Journal of the Acoustical Society of America 70,** 966-975.
60. Soli, S.D. (**1981**). "Second formats in fricatives: The acoustic consequences of fricative-vowel coarticulation," **Journal of the Acoustical Society of America 70,** 976-984.
61. Soli, S.D., Nuechterlein, K.H., Garmezy, N., Devine, V.T., and Schaefer, S.M. (**1981**). "A classification system for research in childhood psychopathology: Part I. An empirical approach using factor and cluster analyses and conjunctive decision rules," in B.A. Maher and W.B. Maher (Eds.), ***Progress in Experimental Personality Research, Vol. 10***, 115-161. Academic Press, New York.
62. Nuechterlein, K.H., Soli, S.D., Garmezy, N., Devine, V.T., and Schaefer, S.M. (**1981**). "A classification system for research in childhood psychopathology: Part II. Validation research examining converging descriptions from the parent and from the child," in B.A. Maher and W.B. Maher (Eds.), ***Progress In Experimental Personality Research, Vol. 10***, 163-202. Academic Press, New York.
63. Soli, S.D. (**1980**). "Some effects of acoustic attributes of speech on the processing of phonetic feature information," **Journal of Experimental Psychology: Human Perception and Performance 6,** 622-638.
64. Yeni-Komshian, G.H., and Soli, S.D. (**1979**). "Extraction of vowel information from fricative spectra" in J.J. Wolf and D.H. Klatt (Eds.), **Speech Communication Papers: 97th Meeting of the Acoustical Society of America,** 37-40.
65. Soli, S.D., and Arabie, P. (**1979**). "Auditory versus phonetic accounts of observed confusions between consonant phonemes," **Journal of the Acoustical Society of America 66,** 46-59.
66. Soli, S.D., and Devine, V.T. (**1976**). "Behavioral correlates of achievement: A look at high and low achievers," **Journal of Educational Psychology 68**, 335-341.
67. Soli, S.D. and Balch, W.R. (**1976**). "Performance biases and recognition memory for semantic and formal changes in connected discourse," **Memory and Cognition 4**, 673-676.

Patents

1. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O'Connell, D (1998). Pressure-regulating ear plug. United States 5,819,745.

2. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1998). Pressure-regulating ear plug. New Zealand NZ319879 (A).
3. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1996). Pressure-regulating ear plug. Russia RU2177769 (C2).
4. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1997). Pressure-regulating ear plug. World International Patent Office WO97/18779.
5. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (2002). Pressure-regulating ear plug. Italy IL124467 (A).
6. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1998). Pressure-regulating ear plug. European Patent Office EPO862398 (A4).
7. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1998). Pressure-regulating ear plug. European Patent Office EPO862398 (B1).
8. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1998). Pressure-regulating ear plug. Canada CA2230135 C.
9. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1998). Pressure-regulating ear plug. Japan 11513261 (T).
10. Mobley, JP, Zhang, C, Soli, SD, Johnson, C, and O-Connell, D (1997). Pressure-regulating ear plug. Australia AU3463895 (A).
11. Soli, SD, and van den Honert, C (1989). Signal processor for and an auditory prosthesis utilizing channel dominance. United States 4,813,417.
12. Soli, SD, and van den Honert, C (1988). Signal processor for and an auditory prosthesis utilizing channel dominance. European Patent Office EPO282336 (A2).
13. Soli, SD, and van den Honert, C (1988). Signal processor for and an auditory prosthesis utilizing channel dominance. European Patent Office EPO282336 (A3).
14. Soli, SD, and van den Honert, C (1988). Signal processor for and an auditory prosthesis utilizing channel dominance. European Patent Office EPO282336 (B1).
15. Soli, SD, Jayaramen, S, Gao, S, and Sullivan, J (1994). Method of signal processing for maintaining directional hearing with hearing aids. United States 5,325,436.
16. Soli, SD, Buckley, KM, and Widin, GP (1995). Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering. United States 5,402,496.
17. Soli, SD, Buckley, KM, and Widin, GP (1994). Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering. European Patent Office EPO581262 (A1).
18. Soli, SD, Buckley, KM, and Widin, GP (1994). Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering. European Patent Office EPO581262 (B1).
19. Soli, SD, Buckley, KM, and Widin, GP (1993). Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering. Japan JP6189396 (A).
20. Soli, SD, Buckley, KM, and Widin, GP (1999). Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering. Denmark DK581263 (T3).
21. Soli, SD, Buckley, KM, and Widin, GP (1999). Auditory prosthesis, noise suppression apparatus, and feedback suppression apparatus having focused adaptive filtering. German Patent DE69325211.
22. Gao, SX, and Soli, SD (2000). Method of measuring and preventing unstable feedback in hearing aids. United States 6,134,329.

23. Gao, SX, and Soli, SD (1999). Method of measuring and preventing unstable feedback in hearing aids. Australia AU9377398.
24. Soli, SD, Miller DA, Woodward, SA, and Miller, SA (2002). Method and apparatus for measuring the performance of an implantable middle ear hearing aid, and the response of a patient wearing such a hearing aid. United States Application US 2002/0048374 A1.
25. Soli, SD, and Fravel, RP (2003). Auditory prosthesis for adaptively filtering selected auditory component by user activation and method for doing same. United States 6, 563, 031 B1.
26. Soli, SD, and Fravel, RP (1994). Auditory prosthesis with user controlled feedback. European Patent Office EPO581261 (A1).
27. Soli, SD, and Fravel, RP (1994). Auditory prosthesis with user controlled feedback. European Patent Office EPO581261 (B1).
28. Soli, SD, and Fravel, RP (1994). Auditory prosthesis with user controlled feedback. Japan JP6189397 (A).
29. Soli, SD, and Fravel, RP (2000). Auditory prosthesis with user controlled feedback. Denmark DK581261 (T3).
30. Soli, SD, and Fravel, RP (1999). Auditory prosthesis with user controlled feedback. German Patent DE69326510 (T2).
31. Soli, SD, and Fravel, RP (1994). Auditory prosthesis with user controlled feedback. Canada CA200015 (A1).
32. Freed, DJ, and Soli, SD (2004). Frequency shifter for use in adaptive feedback cancellers for hearing aids. United States 7,609,841.
33. Gao, SX, Soli, SD, and Chi, HF (2005). Band-limited adaptive feedback canceller for hearing aids. United States 6,876,751 B1.
34. Soli, SD, Miller, DA, Woodward, SA, and Miller, SA (2006). Method and apparatus for measuring the performance of an implantable middle ear hearing aid, and the response of a patient wearing such a hearing aid. United States Application US 2006/0276856 A1.

Copyrights

1. Soli, SD, Vermiglio, A, Iwaki, T, and Shiroma, M (2000). "Sound recordings of Japanese sentences for the Hearing In Noise Test," copyright registered (US).
2. Soli, SD, Nilsson, MJ, Sullivan JA, Sumida, A, and Rayle, H (2000). "Sound recordings of American English sentences for the Hearing In Noise Test," copyright registered (US).
3. Soli, SD, Vermiglio, A, Freed, DJ, and McCaw, V (2000). "User manual for HINT for Windows, Version 6," copyright registered (US).
4. Soli, SD, Nilsson, MJ, and Sullivan, JA (2000). "Text of American English sentences for the Hearing In Noise Test," copyright registered (US).
5. Soli, SD, Vermiglio, A, Iwaki, T, and Shiroma, M (2000). "Text of Japanese sentences for the Hearing In Noise Test," copyright registered (US).
6. Soli, SD, Vermiglio, A, Freed, DJ, Gao, SX, and Nilsson, MJ (2000). "Software code for HINT for Windows, Version 6," copyright registered (US).
7. Zheng, Y, and Soli, SD (2007). Mandarin Early Speech Perception Test (MESP). Chinese copyright 21-2007-A-(2569)-0324.
8. Zheng, Y, and Soli, SD (2007). Mandarin Early Speech Perception Test (MESP) Low-Verbal version. Chinese copyright 21-2007-A-(2570)-0325.

9. Zheng, Y, and Soli, SD (2007). Voice recordings for Mandarin Early Speech Perception Test (MESP). Chinese copyright 21-2007-S-(2571)-0326.
10. Zheng, Y, and Soli, SD (2008). Picture Plates for the Mandarin Pediatric Speech Intelligibility Test (MPSI). Chinese copyright 21-2008-F-(3105)-0160.
11. Zheng, Y, and Soli, SD (2008). Sentence Lists for the Mandarin Pediatric Speech Intelligibility Test (MPSI). Chinese copyright 21-2008-A-(3106)-0161.
12. Zheng, Y, and Soli, SD (2008). Voice recordings for Mandarin Pediatric Speech Intelligibility Test (MPSI). Chinese copyright 21-2008-I-(3107)-0162.

Published Abstracts and Conference Presentations

1. Allsman, C., Eisenberg, L., Soli, S.D., and Sullivan, J. (**1990**). "Field and laboratory ratings of hearing aid sound quality," presented at the Seattle meeting of the American Speech-Language-Hearing Association.
2. Alwan, A., Sequero, M., Soli, S.D., and Gao, S. (**1995**). "An analysis of the acoustic path transfer function in hearing aids," National Institutes of Health Interdisciplinary Forum on Hearing Aid Research and Development, Bethesda, Maryland.
3. Andrew J. Vermiglio and Sigfrid D. Soli (**2006**). The Relationship Between a Pure Tone Hearing Loss Classification Scheme, the Articulation Index And Hearing in Noise Performance. Presentation at the International Hearing Aid Research Conference, Lake Tahoe, California.
4. Andrew J. Vermiglio and Sigfrid D. Soli (**2007**). Relationship of Objective and Subjective Measures of Hearing to OAEs. Presentation at the American Academy of Audiology, Denver, CO.
5. Bassich, C.J., Yeni-Komshian, G.H., and Soli, S.D. (**1984**). "Fricative-vowel coarticulatory effects in Arabic," **Journal of the Acoustical Society of America 76**, S15.
6. Bill Hodgetts, Bo Hakansson and Sigfrid Soli (**2006**). Two in-situ approaches to assessing the audibility of amplified speech for BAHA users. Presentation at the International Hearing Aid Research Conference, Lake Tahoe, California.
7. Cox, KM, Vermiglio, AJ, Niparko, JK, and Soli, SD (**2002**). The bone-anchored hearing aid (BAHA) single-sided deafness study. American Academy of Audiology, Philadelphia, PA.
8. Daniel J. Freed (**2006**). Adaptive feedback cancellation in hearing aids with nonlinear feedback paths. Presentation at the International Hearing Aid Research Conference, Lake Tahoe, California.
9. Edman, T.R., Soli, S.D., and Widin, G.P. (**1978**). "Learning and generalization of intraphonemic VOT discrimination," **Journal of the Acoustical Society of America 63**, S19.
10. Ephraim, Y., Van Trees, H.L., and Soli, S.D. (**1995**). "Enhancement of noisy speech for the hearing impaired using the signal subspace approach," National Institutes of Health Interdisciplinary Forum on Hearing Aid Research and Development, Bethesda, Maryland.
11. Freed, DJ, and Soli, SD (**2004**). Comparative performance of adaptive anti-feedback algorithms in commercial hearing aids and integrated circuits. International Hearing Aid Research Conference, Lake Tahoe, CA.
12. Gao, S., Soli, S.D. (**1999**) A novel approach of adaptive feedback cancellation for hearing aids, IEEE International Symposium on Circuit and System.
13. Gao, S., Soli, S.D. (**1999**) Method of measuring and preventing acoustic feedback in hearing aids, joint annual meeting of Acoustical Society of America and European Acoustic Society, Berlin

14. Gao, S., Sullivan, J., Gelnett, D.J., Jayaraman, S., Wygonski, J., Wu, E., Nilsson, M.J., and Soli, S.D. (**1995**). "Fitting algorithm for a prototype portable binaural digital hearing aid," National Institutes of Health Interdisciplinary Forum on Hearing Aid Research and Development, Bethesda, Maryland.
15. Gao, S., Sullivan, J., Jayaraman, S., and Soli, S.D. (**1994**). "Method for fitting binaural hearing aids," **Journal of the Acoustical Society of America 95**, S2991.
16. Gelnett, D., Nilsson, M.J., Sumida, A., and Sullivan, J. (**1993**). " Normative data for the Hearing In Noise Test (HINT). Paper presented at the American Academy of Audiology, Phoenix, Arizona.
17. Gelnett, D., Hinton, L., and Soli, S.D. (**1995**). "Hearing In Noise Test for Children: Norming results and headphone simulation," American Academy of Audiology, Dallas, Texas.
18. Gelnett, D., Sumida, A., and Soli, S.D. (**1994**). "The development of the Hearing In Noise Test for Children (HINT-C)," American Academy of Audiology, Richmond, Virginia.
19. Gelnett, D.J., Nilsson, M.J., and Soli, S.D. (**1996**). "Use of AI_{MAX} to maximize speech intelligibility in noise for hearing impaired individuals." Poster presented at the Meeting of the American Academy of Audiology, Salt Lake City, Utah.
20. Gelnett, D.J., Soli, S.D., Nilsson, M.J., Dymond, R., and Gamer, A. (**1995**). "Field trials of a portable binaural digital hearing aid," National Institutes of Health Interdisciplinary Forum on Hearing Aid Research and Development, Bethesda, Maryland.
21. Hoffman, M.W., Link, M.J., Buckley, K.M., Soli, S.D., and Jayaraman, S. (**1990**). "Evaluation of reverberant room impulse responses, including the effects of head shadow," **Journal of the Acoustical Society of America 88**, S185.
22. Jayaraman, S., Soli, S.D., Hoffman, M.W., and Buckley, K.M. (**1990**). "Validity of intelligibility measures for adaptive beamforming hearing aids," **Journal of the Acoustical Society of America 88**, S32-S33.
23. Jenny C. Y. Chan, Andrew J. Vermiglio, Sigfrid D. Soli (**2007**). Assessment of a New Power Bone Anchored Hearing Aid (Baha) Processor. Presentation at the American Academy of Audiology, Denver, CO.
24. Jenny Chan, Andrew Vermiglio, Daniel Freed, and Sigfrid Soli (**2006**). Development of a modified HINT protocol and a new localization test for evaluating adults with vastly different binaural abilities. Presentation at the International Hearing Aid Research Conference, Lake Tahoe, California.
25. Kirby, V.M., Nelson, D.A., Soli, S.D., and Fortune, T.W. (**1987**). " Channel interactions measured by forward-masked "place" tuning curves with multichannel electrical stimulation," **Journal of the Acoustical Society of America 82**, S72.
26. Kirby, V.M., Widin, G.P., and Soli, S.D. (**1985**). "Loudness of complex signals presented by electrical stimulation of the auditory nerve," **Journal of the Acoustical Society of America 77**, S81.
27. Kubo, T, Shiroma, M, Iwaki, T, and Soli, SD (**2002**). Development of the Hearing In Noise Test in Japanese. Japanese Audiological Society, Sendai, Japan.
28. Laroche, C, Giguere, C, Vaillencourt, V, and Soli, SD (**2004**). Evaluation of functional hearing abilities in noisy workplaces. Canadian Association of Speech-Language Pathologists and Audiologists, Ottawa, Canada.
29. Mann, V.A., and Soli, S.D. (**1983**). "Asymmetries in the influence of vocalic context on fricative perception," **Journal of the Acoustical Society of America 73**, S53.
30. McCaw, V.M., Nilsson, M.J., & Soli, S.D. (**1997**). "Functional evaluation of the AMA prediction of hearing handicap," American Academy of Audiology, Fort Lauderdale, FL.

31. McFarland, WH, Soli, SD, Vermiglio, AJ. (**2001**) "Digital versus analog hearing aid performance in noise," 115, American Academy of Audiology, San Diego.
32. Meng Yuan, Kevin C. P. Yuen, Tan Lee, Sigfrid Soli, Michael C.F. Tong and Charles A. van Hasselt (**2006**). Frequency-specific expansion of temporal cues for lexical-tone identification in Cantonese. Presentation at the International Hearing Aid Research Conference, Lake Tahoe, California.
33. Nielsen, L.B., Wu., E., Hoffman, M.W., Buckley, K.M., and Soli, S.D. (**1990**). "Design and evaluation of FIR filters for digital hearing aids with arbitrary amplitude and phase response," **Journal of the Acoustical Society of America 87**, S24.
34. Nilsson, M., Sullivan, J., and Soli, S.D. (**1990**). "Development of a speech intelligibility test for hearing aid research," **Journal of the Acoustical Society of America 88**, S175.
35. Nilsson, M.J., Felker, D., Senne, A., & Soli, S.D. (**1993**). "Comparison of hearing handicap, estimated by the AMA method and by self evaluation, with reduction in speech intelligibility in quiet and noise." Paper presented at the American Academy of Audiology, Phoenix, Arizona.
36. Nilsson, M.J., Soli, S.D., & Sullivan, J. (**1993**). "The Hearing in Noise Test: A measurement tool for assessing speech intelligibility in quiet and noise." Paper presented at the American Academy of Audiology, Phoenix, Arizona.
37. Nilsson, M.J., & Soli, S.D. (**1997**). "The influence of masker modulation and linguistic content on functional measures of hearing in noise," National Hearing Conservation Association, Orlando, FL.
38. Nilsson, M.J., and Soli, S.D. (**1994**). "Norms for a headphone simulation of the Hearing In Noise Test: Comparison of physical and simulated spatial separation of sound sources," **Journal of the Acoustical Society of America 95**, S2995.
39. Nilsson, M.J., and Soli, S.D. (**1995**). "Headphone-based test system for the assessment of binaural directional hearing in noise," National Hearing Conservation Association, Cincinnati, Ohio.
40. Nilsson, M.J., and Soli, S.D. (**1996**). "Binaural speech intelligibility in quiet and noise with mild hearing losses: Case studies." Poster presented at the Meeting of the American Academy of Audiology, Salt Lake City, Utah.
41. Nilsson, M.J., and Soli, S.D. (**1996**). "Experience with a functional test of hearing in noise as a screening device for hearing critical jobs." Podium presentation at the Meeting of the National Hearing Conservation Association, San Francisco, California.
42. Nilsson, M.J., Cody, D.F., Vermiglio, A., & Soli, S.D. (**1997**). "Using speech as a masker with the HINT to detect discriminatory hearing loss," American Academy of Audiology, Fort Lauderdale, FL.
43. Nilsson, M.J., Felker, D., Senne, A., and Soli, S.D. (**1993**). " Estimated hearing handicap (using the AMA method and a self-evaluation questionnaire) versus reduction in speech intelligibility in quiet and noise," **Journal of the Acoustical Society of America 93**, S2337.
44. Nilsson, M.J., Gellnet, D., Sullivan, J., and Soli, S.D. (**1992**). "Norms for the Hearing In Noise Test: The influence of spatial separation, hearing loss, and English language experience on speech reception thresholds," **Journal of the Acoustical Society of America 92**, S2385.
45. Nilsson, M.J., Gelnett, D.J., and Soli, S.D. (**1995**). "Binaural directional hearing in noise with conventional hearing aids," National Institutes of Health Interdisciplinary Forum on Hearing Aid Research and Development, Bethesda, Maryland.
46. Nilsson, M.J., Jayaraman, S., and Soli, S.D. (**1993**). "The separate contribution of head-shadow and binaural interactions to directional hearing in noise," **Journal of the Acoustical Society of America 94**, S1888.
47. Nilsson, M.J., Sullivan, J., and Soli, S.D. (**1991**). "Measurement and prediction of hearing handicap using an additive noise model," **Journal of the Acoustical Society of America 90**, S2326.

48. Nilsson, M.J., Sullivan, J., and Soli, S.D. (**1991**). "Validation of a speech intelligibility test using SRT for hearing aid research," **Journal of the Acoustical Society of America 89**, S1960.
49. Nilsson, M.J., Vermiglio, A.J., Soli, S.D (**1998**). "A Comparison of Signal Detection, Speech Understanding, and Localization Performance," poster presentaiton, American Academy of Audiology Tenth Annual Conference, Los Angeles, California.
50. Nilsson, MJ, Vermiglio, AJ, and McCaw, VM (**1998**). "Aided and unaided assessment using HINT for Windows," Instructional course, American Academy of Audiology, Los Angeles.
51. Opie, JM, Mills, D, Smith, S, Donaldson, G, and Soli, SD (**1999**). "New directions in speech perception," Instructional course, American Academy of Audiology, Miami
52. Paul-Brown, D., and Soli, S.D. (**1981**). "Interactions of lexical status and stimulus dominance effects in dichotic listening," **Journal of the Acoustical Society of America 69**, S114.
53. Shiroma, M, Iwaki, T, Kubo, T, and Soli, SD (**2001**). "Development of the Hearing In Noise Test (HINT) in Japanese," IIIrd Congress of Asia Pacific Symposium on Cochlear Implant and Related Sciences, Osaka
54. Sigfrid Soli, Sung-Kyun Moon, Hong Joon Park, Seung-Chul Lee, Young-Myoung Chun, Hanah Lee, Kyoung You, Jae Lee (**2006**). Korean HINT: Cross-Language Equivalency in Normal and CI Listeners. Presented at the 9th International Conference on Cochlear Implants, Vienna, Austria.
55. Sigfrid Soli, Xin Xi, Fei Ji, Ai-Ting Chen, Meng-Di Hong, Dong-Yi Han, Jianing Wei (**2006**). Effects of Cochlear Implant Microphone Location on Speech Intelligibility. Presented at the 9th International Conference on Cochlear Implants, Vienna, Austria.
56. Soli, S.D. (**1978**). "Perceptual segmentation of consonant-vowel syllables," **Journal of the Acoustical Society of America 63**, S5.
57. Soli, S.D. (**1981**). "Second formants in fricatives," **Journal of the Acoustical Society of America 69**, S15.
58. Soli, S.D., and Mann, V.A. (1982). "The influence of vocalic context on the /s/-/sh/ distinction in initial and final position," Journal of the Acoustical Society of America 71, S75.
59. Soli, S.D., and Mann, V.A. (**1983**). "Acoustic and articulatory asymmetries in fricative-vowel and vowel-fricative productions," **Journal of the Acoustical Society of America 73**, S53.
60. Soli, S.D., and Wilson, B.S. (**1988**). "Within-subject comparisons of analog and pulsatile speech processors for cochlear implants," **Journal of the Acoustical Society of America 84**, S40.
61. Soli, S.D., Arabie, P., and Carroll, J.D. (**1984**). "Representation of discrete structure underlying perceptual confusions between phonemes," **Journal of the Acoustical Society of America 76**, S88.
62. Soli, S.D., Kirby, V.M., van den Honert, C., and Widin, G.W. (**1987**). "Evaluation of a multichannel cochlear implant," **Journal of the Acoustical Society of America 82**, S71.
63. Soli, S.D., Kirby, V.M., Van Tasell, D., and Widin, G.P. (**1985**). "Time-intensity envelope cues for consonant recognition," **Journal of the Acoustical Society of America 78**, S69.
64. Soli, S.D., Lasalle, A.D., and Summers, W.V. (**1980**). "Perceptual information for voicing of postvocalic fricatives," **Journal of the Acoustical Society of America 67**, S50.
65. Soli, S.D., Strange, W., and Jenkins, J.J. (**1977**). "Separability of place and voicing cues for initial consonants in natural speech," **Journal of the Acoustical Society of America 61**, S47.
66. Soli, S.D, Vermiglio, A.J., Cruz, R.J. (**2000**). "Clinical applications of the Hearing-in-Noise Test (HINT)," Instructional course presented at the American Academy of Audiology Twelfth Annual Conference, Chicago, Illinois

67. Soli, S.D., and Nilsson, M.J. (**1997**). "Predicting speech intelligibility in noise: The role of factors other than pure-tone sensitivity," **Journal of the Acoustical Society of America**, abstract to be published.
68. Soli, S.D., and Shannon, R.V. (**1993**). "Design of auditory prostheses to aid speech communication," **Journal of the Acoustical Society of America 94**, S1818.
69. Soli, S.D., and Sullivan, J.A. (**1997**). "Factors affecting children's speech communication in classrooms," **Journal of the Acoustical Society of America**, abstract to be published.
70. Soli, S.D., Gao, S.X., & Nilsson, M.J. (**1996**). "An algorithm for enhancement of binaural hearing with hearing aids," **Journal of the Acoustical Society of America 100**, 2739-2740.
71. Soli, S.D., Gelnett, D., Mayhugh, C., Nilsson, M.J., and Agnew, J. (**1995**). "Assessment of binaural directional hearing in hearing aid fitting," Instructional Short Course, American Academy of Audiology, Dallas, Texas.
72. Soli, S.D., Mayhugh, C., and Nilsson, M.J. (**1996**). "Applications for advanced methods of measuring hearing in noise." Short course presented at the Meeting of the American Academy of Audiology, Salt Lake City, Utah.
73. Soli, S.D., Mayhugh, C., Gelnett, D., Agnew, J., and Nilsson, M.J. (**1995**). " Advanced research in hearing in noise," Starkey Research Seminar, American Academy of Audiology, Dallas, Texas.
74. Soli, S.D., Nilsson, M.J., and Gelnett, D.J. (**1996**) "The effects of sensorineural hearing loss on binaural directional hearing." Poster presented at the Meeting of the Association for Research in Otolaryngology, St. Petersburg, Florida.
75. Soli, S.D., Nilsson, M.J., McCaw, V., & Vermiglio, A. (**1997**). "Use of HINT for Windows to assess functional hearing in noise," Short course, American Academy of Audiology, Fort Lauderdale, FL.
76. Soli, S.D., Sullivan, J., Mayhugh, C., Nilsson, M.J., and Agnew, J. (**1994**). "Assessment of binaural directional hearing in hearing aid fitting," Instructional Short Course, American Academy of Audiology, Richmond,
77. Soli, SD (**1997**). "Assessment of binaural directional hearing,", Boston University, Boston, November, (invited)
78. Soli, SD (**1997**). "Effects of language experience on speech intelligibility in noise," ASHA symposium on Second Language Learning, Boston, November, (invited)
79. Soli, SD (**1997**). "Individual differences in functional hearing ability," special session, Acoustical Society of America, San Diego, December, (invited)
80. Soli, SD (**1998**). "Empirical assessment of hearing disability," AAO Committee on Hearing, AAO-HNS Meeting, San Antonio, October, (invited)
81. Soli, SD (**1998**). "Feedback cancellation algorithms for hearing aids," Old Dominion University, Norfolk, October, (invited)
82. Soli, SD (**1998**). "Measuring and preventing acoustic feedback in hearing aids," Issues in Advanced Hearing Aid Research, Lake Arrowhead, May, (invited)
83. Soli, SD (**1998**). "Objective assessment hearing aid benefit," Pre-Convention Workshop on Outcome Assessment, American Academy of Audiology, Los Angeles, (invited)
84. Soli, SD (**1998**). "Recent advances in hearing aid technology," SHHH National Meeting, Boston, June, (invited)
85. Soli, SD (**1999**). "Classroom acoustics and classroom learning," special session, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Chicago, January, (invited)

86. Soli, SD (**1999**). "Feedback cancellation algorithm for hearing aids," Philips Hearing Aid Company, Eindhoven, Netherlands
87. Soli, SD (**1999**). "Feedback cancellation algorithm for hearing aids," Oticon Hearing Aid Company, Copenhagen
88. Soli, SD (**1999**). "Hearing aid technologies and algorithms," Samsung Advanced Institute of Technology, Seoul, Korea, February
89. Soli, SD (**1999**). "Issues in classroom acoustics," Architectural and Transportation Barriers Compliance Board (ACCESS Board), Washington, DC, June, (invited)
90. Soli, SD (**1999**). "The reference transmitter and receiver: Middle ear implant metrology," Otologics' surgeon investigators meeting, AAO, New Orleans
91. Soli, SD (**2000**). "Assessment of binaural function in clinical environments," Binaural Hearing Conference, University of Iowa Medical School, Iowa City, (invited)
92. Soli, SD (**2000**). "Direct mechanical stimulation of the ossicles via middle ear implant devices," International Hearing Aid Research Conference, Lake Tahoe, (invited)
93. Soli, SD (**2000**). "Functional hearing assessment in occupational health," Ear Professionals International Workshop, Lake Geneva, (invited)
94. Soli, SD (**2000**). "HINT and functional hearing assessment," Annual Military Audiology Meeting, Norfolk, (invited)
95. Soli, SD (**2001**). "Current trends in middle ear implants," Special Podium Session, American Academy of Audiology, San Diego, (invited)
96. Soli, SD (**2001**). "Hearing conservation: Alternatives to the present paradigm" Short Course, American Academy of Audiology, San Diego,
97. Soli, SD (**2001**). "Mechanical stimulation of the ossicles via middle ear implant devices," CID Conference, (invited)
98. Soli, SD (**2001**). "Preliminary middle ear implant results," IIIrd Congress of Asia Pacific Symposium on Cochlear Implant and Related Sciences, Osaka (invited)
99. Soli, SD (**2001**). Assessment of functional hearing ability, Sigfrid D. Soli, invited tutorial presentation, National Institute Standards and Technology, Gaithersburg, MD.
100. Soli, SD (**2001**). Assessment of the classroom as a communication channel, Sigfrid D. Soli, invited presentation by the Acoustical Society of America, Ft. Lauderdale, FL.
101. Soli, SD (**2001**). Issues in practical assessment of binaural hearing abilities, Sigfrid D. Soli, invited presentation at Asilomar meeting, August 2001, Pacific Grove, CA.
102. Soli, SD (**2001**). The Hearing In Noise Test (HINT), Sigfrid D. Soli, invited presentation at Academy of Dispensing Audiologists, Asheville, NC.
103. Soli, SD (**2002**). Assessment of functional hearing abilities in noise, SD Soli, Audio Engineering Society, Los Angeles, CA.
104. Soli, SD (**2002**). Assessment of functional hearing ability with the Hearing In Noise Test, SD Soli, invited presentation at the Canadian Speech and Hearing Association, Ottawa, Canada.
105. Soli, SD (**2002**). Assessment of noise levels for hearing-critical jobs, Sigfrid D. Soli, National Hearing Conservation Association, Dallas, TX.

106. Soli, SD (**2002**). Hearing loss, background noise, and functional hearing ability, SD Soli, invited presentation to the Society of Motion Picture and Television Engineers, Los Angeles, CA.

107. Soli, SD (**2002**). Rationale for acoustical performance criteria in classrooms, SD Soli, Orange County Chapter of the Acoustical Society of America, Irvine, CA.

108. Soli, SD (**2003**). Choice and development of testing materials for hearing aid assessment, SD Soli, invited presentation at Prospects for Communicative Research in Hong Kong—2003 Seminar on Development of Language, Speech, and Hearing Assessment Instruments, Hong Kong.

109. Soli, SD (**2003**). IMEHD output and in vitro modeling systems, invited presentation at the FDA Implantable Middle Ear Hearing Device (IMEHD) Strategy Meeting, Rockville, MD.

110. Soli, SD (**2003**). Multilingual assessment of functional hearing ability, SD Soli, invited presentation at the 9th Ajou Otology Symposium—Cochlear Implantation, Ajou University Hospital, Suwon, Korea.

111. Soli, SD (**2003**). Outcome Assessment: Comparing results for tonal and non-tonal languages, SD Soli, invited presentation for the 4th Congress of the Asia Pacific Symposium on Cochlear Implants and Related Sciences, Taipei, Taiwan.

112. Soli, SD (**2003**). Reliability of speech tests for audiological assessment of hearing aid benefit, SD Soli, American Academy of Audiology, San Antonio, TX.

113. Soli, SD (**2003**). Use of the Bone-anchored hearing aid (BAHA) for trans-cranial stimulation of individuals with single-sided deafness, SD Soli, invited presentation for the 4th Congress of the Asia Pacific Symposium on Cochlear Implants and Related Sciences, Taipei, Taiwan.

114. Soli, SD (**2004**). Applications of the Hearing In Noise Test (HINT), SD Soli, invited presentation at the Brazilian International Audiology Meeting, Bauru, Brazil.

115. Soli, SD (**2004**). Are speech tests superior to pure tones for assessing hearing impairment? SD Soli, invited oral presentation at the meeting of the National Hearing Conservation Association, February 2005, Tucson, AZ.

116. Soli, SD (**2004**). Assessment of functional hearing ability in real-world sound environments, SD Soli, invited presentation to the Los Angeles chapter of the Acoustical Society of America, Los Angeles, CA.

117. Soli, SD (**2004**). Clinical measures with IMEHDs: Patient selection, device fitting, outcome assessment, invited presentation at the FDA Implantable Middle Ear Hearing Device (IMEHD) Second Strategy Meeting, Rockville, MD.

118. Soli, SD (**2004**). Development of the Hearing In Noise Test (HINT) in new languages, SD Soli, invited presentation at the Brazilian International Audiology Meeting, Bauru, Brazil.

119. Soli, SD (**2004**). Devices and technologies for enhancing speech communication: What the present holds and the future promises, SD Soli, invited presentation at the National Summit on Deafness sponsored by the AG Bell Association, Washington, DC.

120. Soli, SD (**2004**). Reliability of speech tests for audiological assessment of hearing aid benefit, SD Soli, American Academy of Audiology, Salt Lake City, UT.

121. Soli, SD (**2004**). Use of the bone-anchored hearing aid as a treatment for single-sided deafness, SD Soli, invited oral presentation at the Speech and Hearing Association of Virginia, March 2005, Charlottesville, VA.

122. Soli, SD, and Brackmann, DE (**2002**). HEI's experience with the BAHA as a treatment for single-sided deafness. SD Soli and DE Brackmann, invited presentation at Entific International Conference, Sardinia, Italy.

123. Soli, SD, and Freed, DJ (**2004**). A quantitative evaluation of acoustic feedback cancellation algorithms used in contemporary digital hearing aids. International Symposium on Middle Ear Implants, Kyungpook National University, Daegu, Korea.

124. Soli, SD, and Larson, VD (**2005**). A system for assessing the fit of hearing protectors in the field. National Hearing Conservation Association, Tucson, AZ.

125. Soli, SD, and Vermiglio, AJ (**2001**). "Pure-tone audiometry and the Hearing-in-Noise Test (HINT)," Annual meeting of the National Hearing Conservation Association, Raleigh, (invited)

126. Soli, SD, Gao, S, Vermiglio, AJ, and Freed, DJ (**1999**). "Prevention of acoustic feedback during hearing aid fitting," Instructional course, American Academy of Audiology, Miami

127. Soli, SD, Gao, S, Vermiglio, AJ, and Freed, DJ. (**1999**). "Prevention of acoustic feedback during hearing aid fitting," 144, American Academy of Audiology, Miami.

128. Soli, SD, Laroche, C, and Giguere, C (2003). Predicting speech intelligibility in noise for hearing-critical jobs. Acoustical Society of America, Austin, TX.

129. Soli, SD, Laroche, C, Giguere, C, and Vaillencourt, V (**2004**). A model for prediction of functional hearing abilities in real-world noise environments. International Hearing Aid Research Conference, Lake Tahoe, CA.

130. Soli, SD, Laroche, C, Wong, LN, Shiroma, M, and Abdala, C (**2002**). Cross-language assessment of functional hearing, International Hearing Aid Research Conference, Lake Tahoe, CA.

131. Soli, SD, Vaillencourt, V, Laroche, C, and Giguere, C (**2004**). HINT: A clinical tool unknown to most Canadian audiologists. Canadian Association of Speech-Language Pathologists and Audiologists, Ottawa, Canada.

132. Soli, SD, Vermiglio, AJ, Wen, K, and Abdala, C (**2002**). Development of the Hearing In Noise Test in Spanish, Joint Meeting of the Acoustical Society of America and the Acoustical Society of Mexico, Cancun, Mexico.

133. Soli, SD, Vermiglio, AJ, Wen, K, Laroche, C, Giguere, C, Iwaki,, T, Shiroma, T, and Wong, LN (**2002**). Development of the Hearing In Noise Test (HINT) in New Languages, , American Academy of Audiology, Philadelphia, PA.

134. Sullivan, J.A., Eisenberg, L., Allsman, C., and Soli, S.D. (**1990**). "Laboratory and field evaluation of hearing aid performance in noise," **Journal of the Acoustical Society of America 87**, S25.

135. Sullivan, J., and Soli, S.D. (**1991**). "Effects of hearing aids on directional hearing," **Journal of the Acoustical Society of America 90**, S2267.

136. Summers, W.V., and Soli, S.D. (**1982**). "Syllable type influences the acoustic consequences of variations in lexical stress," **Journal of the Acoustical Society of America 71**, S113.

137. Vaillancourt, V, Laroche, C, Soli, SD, and Giguere, C (**2004**). Use of audio VR to evaluate functional hearing abilities in the workplace. 2004 Conference on Cybertherapy, San Diego, CA.

138. Vermiglio, A.J., Freed, D.J., Soli, S.D (**2000**). "When "Normal" isn't normal part 2: pure-tone audiograms, HINT, DPOAE and HHIA Results for Obscure Auditory Dysfunction (OAD) and control subjects," poster presentation, American Academy of Audiology Twelfth Annual Conference, Chicago, Illinois

139. Vermiglio, A.J., Nilsson, M.J., & Soli, S.D. (**1997**). "Assessment of functional hearing: The Source Azimuth Identification in Noise Test (SAINT)," American Academy of Audiology, Fort Lauderdale, FL.

140. Vermiglio, A.J., Nilsson, M.J., Freed, D.J., Cody, D., Soli, S.D (**1999**). "When "Normal" isn't normal: pure-tone audiograms, HINT, DPOAE and HHIA Results for Obscure Auditory Dysfunction (OAD) and control subject," poster presentation, American Academy of Audiology Eleventh Annual Conference, Miami, Florida.

141. Vermiglio, A.J., Nilsson, M.J., Soli, S.D. Freed, D.J (**1998**). "Development of a Virtual Test of Sound Localization: The Source Azimuth Identification in Noise Test (SAINT)," poster presentation, American Academy of Audiology Tenth Annual Conference, Los Angeles, California.

142. Vermiglio, AJ, and Soli, SD (**2004**). A measurement of sound level perception when using the bone-anchored hearing aid (BAHA) for trans-cranial stimulation of individuals with single-sided deafness, AJ Vermiglio and SD Soli, International Hearing Aid Research Conference, Lake Tahoe, CA.

143. Vermiglio, AJ, Soli, SD, Freed, DJ. (**2001**). "Relationship of audiometric thresholds, HINT and localization," 143, American Academy of Audiology, San Diego,.

144. Widin, G.P., Soli, S.D., and Kirby, V.M. (**1985**). "Perceptual similarity of complex signals presented by electrical stimulation of the auditory nerve," **Journal of the Acoustical Society of America 77**, S81.

145. Wong, L., Sullivan, J.A., and Soli, S.D. (**1993**). "Characterization of hearing aids with broadband noise stimuli." Paper presented at the American Academy of Audiology, Phoenix, Arizona.

146. Yao, K., Korompis, D., Wang, A., Hudson, R., Lorenzelli, F., Soli, S.D., Nilsson, M.J., and Gao, S. (**1995**). "Microphone array for hearing aid preprocessing," National Institutes of Health Interdisciplinary Forum on Hearing Aid Research and Development, Bethesda, Maryland.

147. Yao, K., Soli, S.D., and Korompis, D. (**1994**). "Wideband microphone array for hearing aid preprocessing," **Journal of the Acoustical Society of America 96**, S3244.

148. Yeni-Komshian, G., and Soli, S.D. (**1979**). "Extraction of vowel information from fricative spectra," **Journal of the Acoustical Society of America 65**, S7.

149. Yun Zheng and Sigfrid D. Soli (**2007**). Application of the Mandarin Early Speech Perception Test (MESP). Presentation at the WHO 1st International Conference on Prevention and Rehabilitation of Hearing Impairment, Beijing, PRC.

150. Yun Zheng, Kai Wang, and Sigfrid D. Soli (**2006**). The Mandarin Early Speech Perception Test (MESP): An Assessment Tool for Early Intervention with Hearing Impaired Children. Presentation at the International Hearing Aid Research Conference, Lake Tahoe, California.

151. Yun Zheng, Kai Wang, Zhaoli Meng, and Sigfrid D. Soli (**2007**). Development of the Mandarin Early Speech Perception Test (MESP). Presentation at the WHO 1st International Conference on Prevention and Rehabilitation of Hearing Impairment, Beijing, PRC.

152. Zheng, Y, Soli, SD, Wang, K, Meng, Z (2009). Development of a closed-set test of sentence recognition in noise for Mandarin-speaking children. Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

153. Soli, SD, Yu, J, Soo, G, Wong, T, Tong, M, van Hasselt, CA (2009). Special audiological considerations in fitting osseointegrated implants. Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

154. Zheng, Y, Meng, Z, Tao, Y, Soli, SD (2009). Tone perception development in Mandarin-speaking children with normal hearing. Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

155. Zheng, Y, Meng, Z, Hong, Zheng, H, Soli, SD (2009). Early report on pediatric outcome CI study in China. Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

156. Soli, SD, Zheng, Y, Meng, Z, Tao, Y, Wang, K (2009). Objective longitudinal assessment of the benefits of early intervention in the treatment of pediatric hearing impairment. Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

157. Wong, T, Yu, J, Soo, G, Soli, SD, van Hasselt, CA, Tong, M (2009). Will the new fully programmable sound processor Cochlear Baha BP100 provide additional benefits to subjects with conductive hearing loss and single-sided sensorineural deafness? Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

158. Yu, J, Soo, G, Soli, SD, Wong, T, Tong, M, van Hasselt, CA (2009). Treatment of mixed hearing loss with Baha. Presentation at the Asia-Pacific Symposium on Cochlear Implants and Related Sciences, Singapore.

159. Soli, SD (2010). Factors affecting long-term outcomes for pediatric CI recipients. Presented at the International Otology Conference, Beijing, PRC. (Invited)

160. Soli, SD, So, G, Yu, J, Wong, T, Tong, M, van Hasselt, CA (2010). Direct bone conduction rehabilitation for single-sided deafness (SSD). Presented at the Chinese University of Hong ENT Conference, Hong Kong. (Invited)

161. Soo, G, Yu, J, Soli, SD, Wong, T, van Hasselt, CA, Tong, M (2009). Clinical evaluation of Cochlear Baha BP100: An interim report. Presented at the Chinese University of Hong ENT Conference, Hong Kong.

162. Soli, SD, Zheng, Y (2009). Initial results for pediatric cochlear implant recipients in China. Presented at the Chinese University of Hong Kong Audiology Conference, Hong Kong.

163. Soli, SD (2009). An evidence-based approach to (re)habilitation: Objective outcome research in China. Presented at the China Rehabilitation Research Center for Deaf Children, Beijing. (Invited)

164. Soli, SD, Zheng, Y, Meng, Y (2009). Outcome research on (re)habilitation of pediatric hearing impairment: A foundation for Chinese Audiology. Presented at the 2009 meeting of the Chinese Academy for Audiological Rehabilitation, Chengdu. (Invited)

165. Soli, SD (2009). International harmonization of outcome research on treatment of hearing impairment. Presented at the Startup Ceremony for Designation of the WHO Collaborating Center for Prevention and Rehabilitation of Hearing Impairment, Beijing. (Invited)

166. Soli, SD (2010). Management of Auditory Neuropathy Spectrum Disorder (ANSD). Presented at the China Rehabilitation Research Center for Deaf Children, Beijing. (Invited)

167. Soli, SD, Zheng, Y (2010). Update on Clinical Audiology in the US: Adult diagnostics and new technologies. Presented at the 2009 meeting of the Chinese Academy for Audiological Rehabilitation, Chengdu. (Invited)

Invited Presentations and Activities (Selected)

1985

Gordon Conference on Implantable Auditory Prostheses, Tilton, New Hampshire

1986

Research Laboratory in Electronics, Massachusetts Institute of Technology, Cambridge, Massachusetts

1987

Gordon Conference on Implantable Auditory Prostheses

1988

Kresge Research Institute, University of Michigan, Ann Arbor, Michigan

1989

Engineering Foundation Conference on Implantable Auditory Prostheses, Potosi, Missouri

National Institute on Disability Rehabilitation Conference on Hearing Aid Research, New York, New York

1990

Arrowhead Conference, Issues in Advanced Hearing Aid Research, Lake Arrowhead, California

1991

Conference on Implantable Auditory Prostheses, Asilomar, California

1992

IEEE Workshop in Audio and Acoustic Signal Processing, Mohonk, New York

1993

American Academy of Otolaryngology Cherry Blossom Conference, Washington, D.C.

International Conference on Implantable Auditory Prostheses and Hearing Aids, Orlando, Florida

1994

Arrowhead Conference, Issues in Advanced Hearing Aid Research, Lake Arrowhead, California

1995

John O'Neal Lecture, University of Illinois, Champaign, Illinois

40th International Congress of Hearing Aid Acousticians, Hamburg, Germany

International Symposium on Signals, Systems, and Electronics, San Francisco, California

1996

Special Session on Digital Hearing Aids, Joint Meeting of the Acoustical Society of America and the Acoustical Society of Japan, Honolulu, Hawaii

1997

Workshop on Classroom Acoustics, Acoustical Society of America, Los Angeles, California

International Symposium on Speech Perception by Non-Native Listeners, Boston, Massachusetts

Special Session on Basic Science at the Intersection of Speech Science and Communication Disorders, Acoustical Society of America, San Diego, California

1998

Arrowhead Conference, Issues in Advanced Hearing Aid Research, Lake Arrowhead, California

Department of Electrical Engineering, Old Dominion University, Norfolk, Virginia

Von Ripper Lectures, University of Western Michigan, Kalamazoo, Michigan

1999

Special session on classroom acoustics, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Chicago

Special presentation on issues in classroom acoustics, Architectural and Transportation Barriers Compliance Board (ACCESS Board), Washington, DC

2000

Annual Military Audiology Meeting, Norfolk

Workshop on Advances in Hearing Assessment for Occupational Health, Ear Professionals International, Lake Geneva

Binaural Hearing Conference, University of Iowa Medical School, Iowa City

International Hearing Aid Research Conference, Lake Tahoe

Annual meeting of the National Hearing Conservation Association, Raleigh

2001

CID Conference in Honor of James Miller, St. Louis

Special Podium Session on Middle Ear Implants, American Academy of Audiology, San Diego

Asilomar Conference on Implantable Auditory Prostheses

Hong Kong University Hearing and Speech Department

2002

National Hearing Conservation Association, Dallas

California Speech and Hearing Association

Entific International Conference, Sardinia

Ajou University, Korea

Audio Engineering Society, Los Angeles

Acoustical Society of America, Cancun

Chinese University of Hong Kong (2 talks)

National Acoustics Laboratory, Sydney

2003

The 9th Ajou Otology Symposium, Suwon, Korea

4th Congress of Asia Pacific Symposium on Cochlear Implant and Related Sciences (APSCI), Taipei, Taiwan

Kyoto Satellite Symposium to Asia Pacific Symposium on Cochlear Implants and Related Sciences, Kyoto, Japan

Seminar on the Development of Speech and Hearing Assessment Tools, Chinese University of Hong Kong, Hong Kong

Acoustical Society of America, Austin

2004

AG Bell Summit on Deafness, Washington, DC

University of Alberta Department of Hearing and Speech Science, Edmonton, Alberta

Brazilian Audiology Association, Bauru, Brazil

Canadian Association of Speech Pathologists and Audiologists, Ottawa, Canada

2005

Speech, Hearing, and Audiology Association of Virginia, Charlottesville

Seminar on Mathematics of the Ear and Sound, Institute for Pure and Applied Mathematics, University of California Los Angeles

Seminars on direct connect CI testing, Beijing, China, and Seoul, Korea

Seminar on Middle Ear Implants, Kyungpook National University, Daegu, Korea

Keynote lecture, Forum for hearing instrument developers, Oldenburg, Germany

2006

Keynote lecture on global harmonization of audiology, Implant and Rehabilitative Otology, Chinese University of Hong Kong, Hong Kong, China

Keynote lecture, founding ceremony for the Chinese Academy of Audiological Rehabilitation, Tianjin, China

Seminars and lectures on functional hearing assessment, National Meeting of the Turkish Academy of Audiology, Ankara, Turkey

Seminar on round window implants, World Congress on Medical Physics and Biomedical Engineering 2006, Seoul, Korea

2007

Seminar on middle ear and cochlear implants, Seoul National University, Seoul, Korea

Seminars out pediatric outcome assessment in Mandarin, World Health Organization Meeting, Beijing, China

2008

Seminar on assessment of functional hearing impairment in occupational settings, Military Audiology Association, Portland

Guest Professor and Lecturer, ENT Department, West China Hospital, Sichuan University, Chengdu, China

Guest Professor and Lecturer, Department of Otolaryngology/Head and Neck Surgery, Prince of Wales Hospital, Chinese University of Hong Kong, Hong Kong, China

Invited speaker and co-chair, The 6th International Symposium on Advanced Technologies for Recovery of Human Sensibility, Advanced Research Center for Recovery of Human Sensibility, Kyungpook National University, Daegu, Korea

Invited speaker, Advances in Vibroplasty Research, Unfallkrankenhaus, Berlin, Germany

Invited speaker, The 6th Inner Disease and Cochlear Implantation Symposium, Kusadasi, Turkey

Invited speaker, Special Session to Honor James J. Jenkins, Acoustical Society of America, Miami, Florida

Invited speaker, The 2008 Chinese University of Hong Kong Ear, Nose, and Throat Conference: Functional Restoration in ENT, Hong Kong, China

2009

Invited speaker, Vibrant Soundbridge Symposium, Hannover Medical University, Hannover, Germany

Invited speaker, Ceremony for the Designation of the World Health Organization Collaborating Center for the Prevention and Rehabilitation of Hearing Impairment, Great Hall of the People, Beijing, China

Invited speaker, The 2009 Chinese University of Hong Kong Ear, Nose, and Throat Conference, Hong Kong, China

Invited speaker, 2009 Asia Pacific Symposium on Cochlear Implants and Related Sciences, Singapore

2010

Invited speaker, Chinese Academy of Audiological Rehabilitation, Chengdu, China

Invited speaker, China Rehabilitation and Research Center for Deaf Children, Beijing, China

Invited speaker, The 2010 Chinese University of Hong Kong Ear, Nose, and Throat Conference, Hong Kong, China

Invited speaker, XVth Anniversary Symposium of the International Association of Physicians in Audiology, Krakow, Poland

2011

Invited speaker, Hearing Fitness for Duty Joint Department of Defense Workshop, San Diego, California

2012

Invited speaker, Middle Ear Mechanics in Research and Otology Meeting, Daegu, Korea

Invited speaker, International Hearing Aid Conference, Lake Tahoe, California

2013

Invited speaker, Shanghai Clinical Center, Chinese Academy of Science, Shanghai, China

2014

Invited speaker, International Pediatric Audiology Conference, Shanghai, China

Documents and Materials Relied On

Physical Samples

3M Combat Arms Earplugs Version 2

Moldex BattlePlug Earplugs

Patents and File Histories

U.S. Patent 5,936,208 and File History

U.S. Patent 6,070,693 and File History

U.S. Patent 5,113,967

French Patent Publication 2 676 642

U.S. Patent 6,068,079

U.S. Patent 3,565,069

U.S. Patent 4,587,965

U.S. Patent 2,717,596

U.S. Patent 8,161,975

Deposition Materials

Exhibit 5009 from Deposition of Brian Myers 9/29/2015

Transcript from Deposition of Brian Myers 9/29/2015

Court Documents

3M's Infringement Contentions - Comparison of U.S. Patent No. 6,070,693 with Moldex BattlePlugs

Joint Claim Construction Statement U.S. Patent No. 6,070,693
Document 31-1 Filed 11/1/2012

Moldex Battleplugs advertisement
Exhibit D to Document 1-1 Filed 3/8/2012

"Empirical evaluation using impulse noise of the level-dependency of various passive earplug designs" E.H. Berger and P. Hamery
Exhibit B to Document 36-2 Filed 1/18/2013

Moldex Battleplugs Schematic
Exhibit G to Document 36-2 Filed Under Seal 1/18/2013

Moldex Battleplugs Schematic
Exhibit H to Document 36-2 Filed Under Seal 1/18/2013

Moldex Battleplugs Schematic
Exhibit I to Document 36-2 Filed Under Seal 1/18/2013

"Nonlinear Hearing Protection Devices" A.Dancer and P. Hamery
Exhibit Q to Document 36-2 Filed 1/18/2013

Exhibit A to Invalidity Contentions – Moldex's Chart Demonstratng Invalidity of U.S. Pat. No. 6,070,693 Over FR2676642 (First Published 11/27/1992)

Exhibit B to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Patent No. 6,070,693 Over U.S. Pat. No. 2,717,596 (Issued Sep. 13, 1955)

Exhibit C to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 4,587,965 (Issued 5/13/1986)

Exhibit D to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 2,427,664 (Issued Sep. 23, 1947)

Exhibit E to Invalidity Contentions s – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 3,656,069 (Issued 2/23/1971)

Exhibit F to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over JP 06-343659 (Issued Dec. 20, 1994)

Exhibit G to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 6,068,079 (Filed Aug. 11, 2997)

Exhibit H to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 2,437,490 (Issued March 9, 1948)

Exhibit I to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 4,540,063 (Issued Sep. 10, 1985)

Exhibit J to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over U.S. Pat. No. 2,881,759 (Issued April 14, 1959)

Exhibit K to Invalidity Contentions – Moldex's Chart Demonstrating Invalidity of U.S. Pat. No. 6, 070, 693 Over DE4217043 (A1) (First Published 1992/11/26)

Exhibit L to Invalidity Contentions – Moldex's Summary Chart Demonstrating Invalidity of U.S. Pat. No. 6,070,693 Over Exemplary References Through Direct Comparison to 3M's Infringment Contention Graphics

Documents Produced

3M00089747-3M0089748 Combat Arms Earplugs advertisement

3M00101316-3M00101317 Combat Arms Earplugs advertisement

Other Materials

"Acoustic Nonlinearity of an Orifice" by Uno Ingard and Harmut Ising
The Journal of the Acoustical Society of America
Received 15 February 1967